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3,463,109

LEVELER TRIM TAB FOR BOAT HULLS

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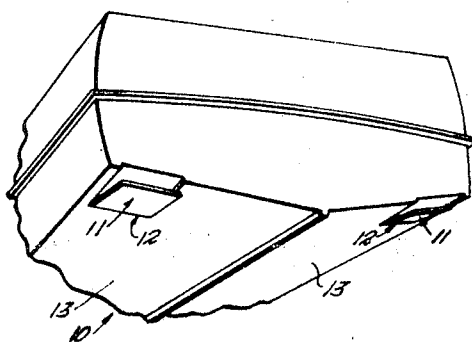


Fig. 1

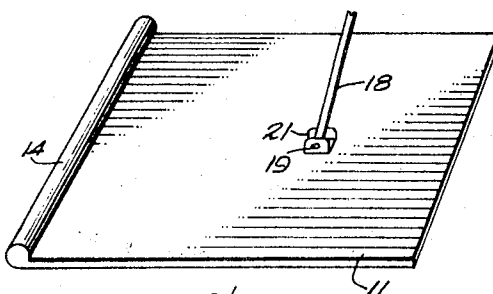


Fig. 2

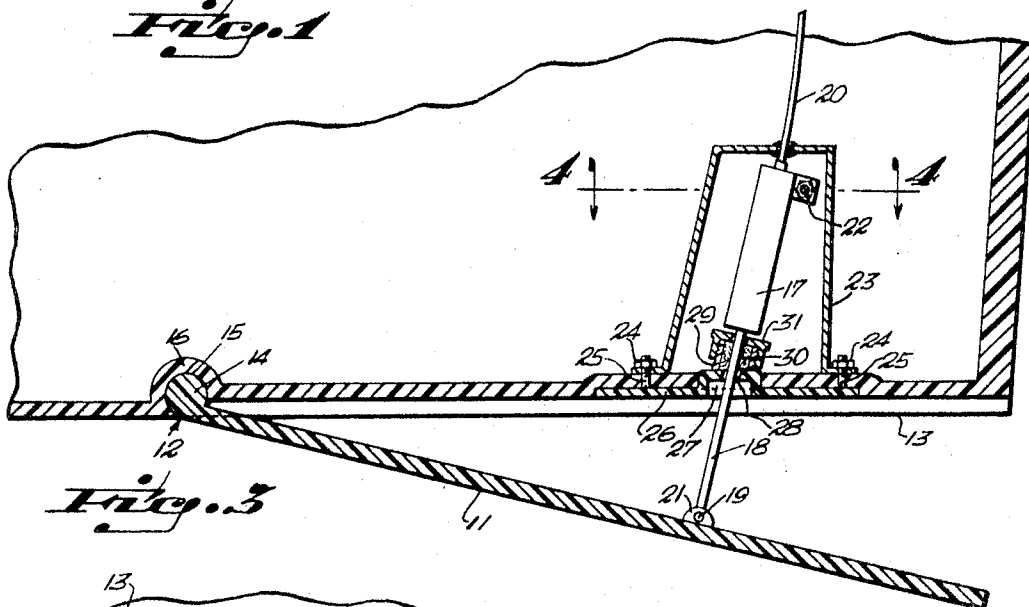


Fig. 3

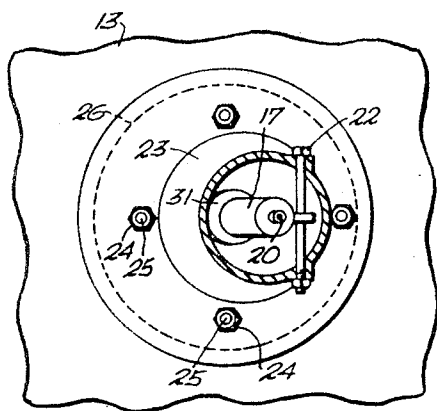


Fig. 4

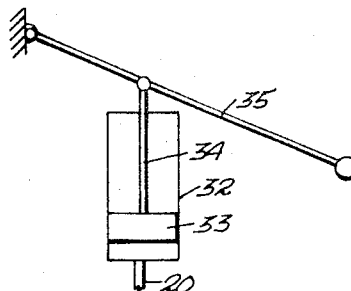


Fig. 5

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LEVELER TRIM TAB FOR BOAT HULLS
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8 Claims

ABSTRACT OF THE DISCLOSURE

A leveler trim tab construction for molded boat hulls comprising a trim tab having a pintle portion integrally formed along one edge, integrally molded about which is the boat hull bottom, that portion of the boat hull bottom molded about the pintle portion of the trim tab providing, together with the pintle portion, a fully streamlined hinge. Since the hull bottom is molded around the preformed trim tab placed in the bottom of the boat mold, substantially perfect streamlining is achieved when the trim tab is in fully withdrawn position.

This invention relates, generally, to boat hulls, and is directed particularly to improvements in leveler trim tabs of the type used in leveling and improving planing performance of boat hulls, particularly in motor yachts and the like.

With the objectives of leveling boat hulls to correct for list and to improve planing action, it is known to use a pair of individually-adjustable downwardly-swingable trim tabs, one at each side of the stern of the hull. Such trim tab devices as have heretofore been devised, however, have been generally unsatisfactory, principally in that they used metallic hinges, and were poorly streamlined with respect to the hull bottom, resulting in early deterioration and inefficient operation.

It is, accordingly, the principal object of this invention to provide a novel and improved boat hull trim tab construction of the above nature which obviates the above described deficiencies of prior devices.

A more particular object is to provide a trim tab structure, particularly suited to use with hulls of molded glass fiber reinforced synthetic resin construction, wherein a continuous pintle is integrally molded along the width of the trim tab, and wherein the hinging mechanism is fabricated integrally with the hull structure by molding the hull bottom around the top and side edges of the tab member during the "lay-up" construction of the boat hull in the mold, whereby the trim tab will be perfectly faired with respect to the hull bottom, the pintle, in association with that part of the boat hull molded therearound, acting as a continuous hinge.

Yet another object is to provide a trim tab construction of the character described including improved watertight mechanism for adjusting the angle of attack of the trim tab.

Other objects, features and advantages of the invention will be apparent from the following description when read with reference to the accompanying drawings. In the drawings, wherein like reference numerals denote corresponding parts throughout the several views:

FIG. 1 is a partial view of a boat hull equipped with boat leveling trim tabs embodying the invention;

FIG. 2 illustrates, in oblique view, one of the leveler trim tabs, shown separately;

FIG. 3 is a partial vertical cross-sectional view of the boat hull illustrated in FIG. 1, taken through one of its leveler trim tabs and associated control mechanism;

FIG. 4 is a partial top view of the boat hull illustrating details of the control mechanism associated with one of the leveler trim tabs; and

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FIG. 5 is a schematic view of the hydraulic master cylinder of a typical remote control system for operating a leveler trim tab.

Referring now in detail to the drawings, 10 in FIG. 1 illustrates the rear end portion, as seen from underneath, of a boat hull equipped with boat leveling trim tabs 11 embodying the invention. Since the leveler trim tabs 11 are identical in construction, being utilized in opposition at the stern of the hull in closely spaced relation to the sides thereof, only one will be described in detail by way of example. The invention has particular applicability to molded fiberglass hull construction and as a salient feature includes a novel and improved hinge structure facilitating the construction and assembly of the leveler trim tab to the hull in a manner achieving superior fairing and seaworthiness characteristics.

As illustrated in FIGS. 1 and 3 the leveler trim tab 11, which is generally rectangular in shape, is hinged along its forward end, as indicated at 12 in the flat bottom surface 13 of the boat hull 10. To this end the leveler trim tab 11, which is preferably fabricated of molded fiberglass, i.e. a glass fiber reinforced synthetic resin, is of flat laminar construction having integrally formed along one edge (along its width) a circular bead 14 the cross-sectional diameter of which is substantially greater than the thickness of the leveler trim tab, and which projects upwardly of the upper surface thereof. As illustrated in FIG. 3, the circular bead 14 at the forward end of the leveler trim tab 11 serves as a pintle 15 turnable with respect to an inter-fitting, elongated socket portion 16 molded in the boat hull bottom surface 13 during construction of the hull. To this end, the prefabricated leveler trim tab 11 will be set in place in the bottom of the boat mold and appropriately waxed or otherwise treated to prevent adherence to the boat hull when completed, and the hull will then be molded in its mold around said leveling trim tab. With such construction it will be readily apparent that the leveler trim tab 11, when fully withdrawn against the underside of the hull as hereinafter described, will present a completely stream-lined or faired appearance, being discernable from an integrally-formed hull bottom only by the lines of separation around said leveling trim tab. As illustrated in FIG. 3, the circular bead portion 14 of the leveler trim tab 11 will be of such diametrical cross-sectional size with respect to the thickness of the remainder of said leveler trim tab as will enable the elongated socket portion 16 of the boat hull bottom 13 to surround said bead or pintle portion to an extent substantially greater than 180 circular degrees, thereby insuring locked-in interengagement of said leveler boat trim tab with said boat hull bottom.

Remote control means is provided for adjustably extending the leveler trim tab 11 in pivotal action about its hinge 12. To this end a hydraulic cylinder 17 is fixed with respect to the inside of the boat hull 10, having an extensible and retractable piston rod 18 extending through said hull bottom in the manner hereinafter described and terminating at its outer end in a short cross-rod 19 journaled at each side in bearing openings at each side of a U-shaped journal block 21 affixed against the upper surface of the leveler trim tab 11.

As is best illustrated in FIG. 3 the hydraulic cylinder 17 is secured, as by a transverse bolt 22, to the side walls of a generally cylindrical housing 23 the lower end of which is attached as by machine nuts 24 to threaded studs 25 extending upwardly from a mounting plate 26 which is molded into the hull bottom during fabrication of the hull to present a smooth, flat surface for the seating thereagainst of the leveling trim tab 11 when in its fully withdrawn position. As further illustrated in FIG. 3 the mounting plate 26 is formed with an upwardly-extending central recess 27 providing a chamber for the reception of

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the U-shaped journal block 21. The mounting plate 26 is also formed with a central opening 28 for through passage of the piston rod 18. To provide a water-tight bushing around the central opening 28, the mounting bracket 26 has an externally-threaded integral sleeve 29 surrounding the opening 28 adapted to receive packing 30 held in place by a centrally-apertured packing cap 31 threadable on the sleeve 29.

It is to be noted that the cylindrical housing 23 surrounding the above-described bushing mechanism serves to limit the entrance of water, in case of leakage, to the interior of said housing, thereby preventing the possibility of flooding of the boat hull, the height of said housing being greater than the normal level of water at the outside of the hull.

As illustrated schematically in FIG. 5, the angular position of the leveling trim tab 11 can be controlled, by way of example, by a remote master cylinder 32 having a piston 33 carrying a piston rod 34. Positional adjustment of the piston 33 in its cylinder will be manually effected by up and down movement of a control lever 35 pivotally fixed at one end and centrally linked to the outer end of the piston rod 34. Downward movement of the outer end of the control lever 35 (as illustrated in FIG. 5) will force hydraulic fluid in the master cylinder and fluid connector line 20 into the hydraulic cylinder 17, forcing its piston (not illustrated) downwardly to correspondingly move its associated leveler trim tab 11 downwardly. The hydraulic cylinder 17 is preferably equipped with a helical spring constraining its piston in the upward or withdrawn position, so that, upon raising of the control lever 35, the hydraulic cylinder 17 will automatically return the hydraulic fluid to the master cylinder 32 and at the same time withdraw its associated leveling trim tab.

It is to be noted that even though the range of angular movement of leveler trim tab 11 is small, the approximate maximum being shown in FIG. 3, there will be a slight sideward movement of the piston rod 18 accompanying its in and out movement. This movement is small enough to be accommodated for by slight flexing of the piston rod 18. In this connection it is to be noted that the piston 17 is not so rigidly attached to the housing structure 23 as will prevent slight relative movement in the relief of inordinate stress.

While I have illustrated and described herein only one form in which my invention can conveniently be embodied in practice, it is to be understood that this form is presented by way of example only and not in a limiting sense. For example, while the invention is illustrated in connection with a flat-bottomed hull, it is to be understood that it could as well be applied to hulls of somewhat curved configuration, the trim tabs being flexible enough to accommodate to such curvature over their short range of operation. The invention, in brief, comprises all the modifications and embodiments coming within the scope and spirit of the following claims.

What I claim as new and desire to secure by Letters Patent is:

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1. A leveler trim tab structure for molded boat hulls comprising, a trim tab member integrally-formed along one edge with a pintle portion of circular cross-sectional shape along its length, and a molded boat hull having a hull bottom portion molded around said trim tab member, that portion of said hull bottom portion molded around said pintle portion constituting therewith a hinge structure permitting in and out swinging movement of said trim tab member with respect to said hull bottom portion.

2. A leveler trim tab structure as defined in claim 1 wherein said pintle portion is off-set with respect to the upper side of said flat trim tab member.

3. A leveler trim tab structure as defined in claim 2 wherein that portion of said hull bottom portion molded around said pintle portion extends therearound to an extent greater than 180 circular degrees.

4. A leveler trim tab structure as defined in claim 3 including remotely controllable means for adjustably positioning the relatively swung position of said trim tab member with respect to said boat hull.

5. A leveler trim tab structure as defined in claim 4 wherein said positioning means comprises a hydraulic slave cylinder having a movable piston rod extending through an opening in said boat hull and journaled at its outer end to the upper side of said trim tab member.

6. A leveler trim tab structure as defined in claim 5 including bushing means within said boat hull and surrounding said movable piston to inhibit water leakage thereat.

7. A leveler trim tab structure as defined in claim 6 including a substantially cylindrical housing secured against the inside of said boat hull in surrounding relation with respect to said bushing means and said slave cylinder to minimize the possibility of flooding of the interior of the boat hull upon leakage at said bushing means.

8. A leveler trim tab structure as defined in claim 7 wherein the means securing said housing comprises a metal plate molded in said hull bottom to present a continuously flat surface therewith at that portion of the underside of said hull, said plate being provided with upwardly-extending bolt means received in openings in said housing for bolting thereto.

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