ABSTRACT: A boat having a pair of trim tabs pivotally mounted rearwardly of the transom on transverse axes intermediate the leading and trailing edges of the trim tabs. The trim tabs are operable at slow speeds to lift the rear of the boat and become inoperable at high speeds.
AUTOMATIC TRIM ATTACHMENT FOR POWER BOATS

This invention relates to boating and particularly to power boats.

BACKGROUND OF THE INVENTION

In my U.S. Pat. Nos. 3, 062,167 and 3,399,643, there are disclosed and claimed trim attachments for power boats which comprise trim members that are hinged to the stern of the boat about transverse axes and are adjusted about these axes to provide varying degrees of lift. Such an arrangement permits longitudinal and lateral trimming of the boat under varying load in order to obtain optimum attitude for movement of the boat through the water and results in greater speed with less fuel consumption, improves visibility and permits adjustment so that the boat can be boarded for varying load conditions and can be removed in rough water.

It is well known that at slower speeds a good planning hull is often far from its optimum or most efficient planing angle. This is particularly true of boats with inboard-outboard engines wherein a heavy engine is positioned at the stern with the drive unit aft of the transom. Many boats of this type are almost impossible to operate at intermediate speeds such as 8 to 20 miles per hour since the bow rises so steeply that the operator cannot see anything forwardly.

Among the objects of the present invention are to provide a trim attachment that automatically operates to improve the lift of the rear of the boat at intermediate speeds and becomes automatically inoperable as the boat assumes its correct planing angle at high speeds.

SUMMARY OF THE INVENTION

A boat having a pair of trim pivotally mounted rearwardly of the transom of transverse axes intermediate the leading and trailing edge of the trim tabs. The trim tabs are operable at slow speeds to lift the rear of the boat and become inoperable at high speeds. The water flow aft from under the hull rises relative to the portion not relative to the boat, thus the greater the squat the greater the lift of the tabs. Regardless of the passenger load or the lack of it aboard the boat the trim tabs maintain the boats trim angle to a tolerance of approximately 1°.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a fragmentary plan view of a boat embodying the invention.

FIG. 2 is a fragmentary perspective view of a boat embodying the invention.

FIG. 3 is a fragmentary side-elevational view on an enlarged scale of a portion of the boat shown in FIG. 1.

FIG. 4 is a fragmentary sectional view on an enlarged scale taken along the line 4—4 in FIG. 3.

FIG. 5 is a fragmentary plan view of a modified form of the invention.

FIG. 6 is a fragmentary sectional view taken along the line 6—6 in FIG. 5.

FIG. 7 is a fragmentary view on a reduced scale of a boat embodying the invention of FIGS. 5 and 6.

DESCRIPTION

Referring to FIG. 1, power boat 10 herein shown as including an inboard-outboard engine and drive unit 11 has trim members 12 pivotally mounted rearwardly of the transom 13 on each side of the center line, as presently described.

Two pairs of brackets 14 comprising right angle sections are mounted on the hull 15. As shown, the brackets 14 are supported in a manner that the horizontal flange 16 is fixed to the underside of the boat while the vertical flange 17 extends from the outer edge downwardly. The flanges 17 of each pair of brackets 14 face one another.

Each trim member 12 is made of generally uniformly thick material such as sheet metal and comprises a substantially flat central portion 18, a forward portion 19 which has a lesser length than the portion 18 and extends upwardly at a slight angle, and a front upwardly turned edge 20. Each trim member further includes downwardly extending side flanges 21 which extend along the flanges 17 of brackets 14.

The flanges 17 have a plurality of longitudinally spaced openings 22 and the flanges 21 similarly have openings 23 permitting selective positioning of the trim member for pivotal movement about transverse axes of the brackets 14. As specifically shown in FIG. 4, a bolt 24 is provided to extend through the openings 23, 22 and a locknut 25 is threaded on the end of the bolt. A washer 26 is interposed between the flanges 17, 21 to insure free pivotal movement of the trim members. In each position of the trim members, the forward edge 20 is spaced rearwardly from the transom 13 of the boat.

In the idle position of the boat, a projection 26 on the end of each bracket extends under the underside of portion 18 limiting the downward movement of the rear portion 18 of the trim member.

In the opposite direction the portion 19 engages the flanges 16 to limit the downward movement of the front portion 19 as shown in FIG. 3.

In operation on the boat is operating at slow speeds, there is a tendency for the water to follow the hull and move upwardly in the area rearwardly of the transom 13. This causes the force of the water to engage the portion 20 maintaining the portion 20 in its broken line position as shown in FIG. 3 and thereby causing a lift on the rear of the boat. As the speed of the boat increases, the amount of water striking the portion 19 is reduced so that the trim member can then assume the position shown in solid lines in FIG. 3.

It has been found that the length of the portion 19 with respect to the portion 18 produces good results when the ratio of the lengths is approximately 1:2.

In the form of the invention shown in FIGS. 5—7, the trim members 30 are made of generally uniformly thick material such as polycarbonate plastic and comprise a central portion 31, flanges 32, a forward portion 33, and a downwardly and rearwardly extending portion 34 hinged to the front of the portion 33. A screw 35 is adapted to be threaded through the trim tab into engagement with the portion 34 which forms its secondary trim member thereby adjusting the angle of the secondary trim ember.

The entire trim member 30 is hinged to a bracket 36 fastened to the transom 37 of the boat and extending downwardly and rearwardly such that when the trim member is in a horizontal position, it is in parallel and spaced above the plane of the underside 38 of the boat.

This form of the invention operates in substantially the same manner as the previously described form except that the secondary trim member 34 permits a further adjustment by changing its angularity.

1. In a power boat, the combination comprising:
   bracket means extending rearwardly from the stern of the boat on each side of the centerline of the boat,
   a pair of trim members,
   means for pivotally mounting each said trim member on each side of the centerline of the boat intermediate its forward and trailing edges for pivotal movement about a transverse axis in such a manner that the rear portion of said trim members normally extends below the front portion,
   the front edge of each said trim member being spaced rearwardly from the stern,
   whereby at slow speed the water strikes the forward portions of the trim members and as the speed of the boat progresses, the trim members tend to assume a more horizontal position,
   each said trim member including a substantially planar portion and longitudinally extending downwardly extending flanges thereon.
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2. The combination set forth in claim 1 including means for limiting the extent to which the rear of each trim member moves rearwardly.

3. The combination set forth in claim 1 wherein said means for pivotally mounting each said trim member on said bracket comprises complementary surfaces on said bracket and said flanges, and bolt means extending through openings in said complementary surfaces.

4. The combination set forth in claim 3 wherein said brackets and said trim members include interengaging surfaces limiting the downward movement of the rear portion of the trim member.

5. The combination set forth in claim 3 wherein said brackets and said trim members include longitudinally spaced openings for selectively pivotally mounting said trim members on said brackets.

6. The combination set forth in claim 1 including an upwardly turned flange on the front transverse edge of each said trim member.

7. The combination set forth in claim 1 including a rearwardly extending secondary trim member on the undersurface of said first-mentioned trim tab and extending rearwardly from the front edge thereof.

8. The combination set forth in claim 7 wherein said trim tab is made of a material whereby said secondary trim member is integral with said first trim member and connected thereto by an integral hinge at the forward end of the trim member, and means for adjusting the angular relation of the secondary trim tab with respect to said first trim tab.

9. The combination set forth in claim 1 including means on at least one said bracket for limiting the movement of said trim member to a generally horizontal position.

10. In a power boat, the combination comprising: bracket means extending rearwardly from the stern of the boat on each side of the centerline of the boat, a pair of trim members, means for pivotally mounting each said trim member on each side of the centerline of the boat intermediate its forward and trailing edges for pivotal movement about a transverse axis in such a manner that the rear portion of said trim members normally extends below the front portion, the front edge of said said trim member being spaced rearwardly from the stern, whereby at slow speed the water strikes the forward portions of the trim members and as the speed of the boat progresses, the trim members tend to assume a more horizontal position, the ratio of the portion of each trim member which is forwardly of the transverse pivotal axis to the portion of each trim member rearwardly of said transverse pivotal axis being about 1:2.

11. For use in a power boat, the combination comprising: bracket means adapted to extend rearwardly from the stern of the boat, a trim member, means for pivotally mounting said trim tab intermediate its ends for pivotal movement about a transverse axis in such a manner that the rear portion of said trim member normally extends below the front portion, the front edge of said trim member being adapted to be spaced rearwardly from the stern, whereby at slow speed the water will strike the forward portion of the trim member and as the speed of the boat progresses, the trim member will tend to assume a more horizontal position, said trim member including a substantially planar portion and longitudinally extending downwardly extending flanges thereon.

12. The combination set forth in claim 11 including means for limiting the extent to which the rear of the trim member moves downwardly.

13. The combination set forth in claim 11 wherein said means for pivotally mounting said trim member on said bracket comprises complementary surfaces on said bracket and said flanges, and bolt means extending through openings in said complementary surfaces.

14. The combination set forth in claim 13 wherein said brackets and said trim member include interengaging surfaces limiting the downward movement of the rear portion of the trim member.

15. The combination set forth in claim 13 wherein said brackets and said trim member include longitudinally spaced openings for selectively pivotally mounting said trim member on said brackets.

16. The combination set forth in claim 11 including an upwardly turned flange on the front transverse edge of said trim member.

17. The combination set forth in claim 11 including a rearwardly extending secondary trim member on the undersurface of said first-mentioned trim tab and extending rearwardly from the front edge thereof.

18. The combination set forth in claim 17 wherein said trim member is made of a material whereby said secondary trim member is integral with said first trim member and connected thereto by an integral hinge at the forward end of the trim member, and means for adjusting the angular relation of the secondary trim member with respect to said first trim member.

19. The combination set forth in claim 11 including means on said bracket for limiting the movement of said trim member to a generally horizontal position.

20. For use in a power boat, the combination comprising: bracket means adapted to extend rearwardly from the stern of the boat, a trim member, means for pivotally mounting said trim tab intermediate its ends for pivotal movement about a transverse axis in such a manner that the rear portion of said trim member normally extends below the front portion, the front edge of said trim member being adapted to be spaced rearwardly from the stern, whereby at slow speed the water will strike the forward portion of the trim member and as the speed of the boat progresses, the trim member will tend to assume a more horizontal position, the ratio of the portion of each trim member which is forwardly of the transverse pivotal axis to the portion of each trim member rearwardly of said transverse pivotal axis being about 1:2.