March 18, 1969 C. W. POOLE 3,433,195

HYDROFOIL DEVICE FOR OUTBOARD MOTORS

Filed Aug. 23, 1967

FIG. 1

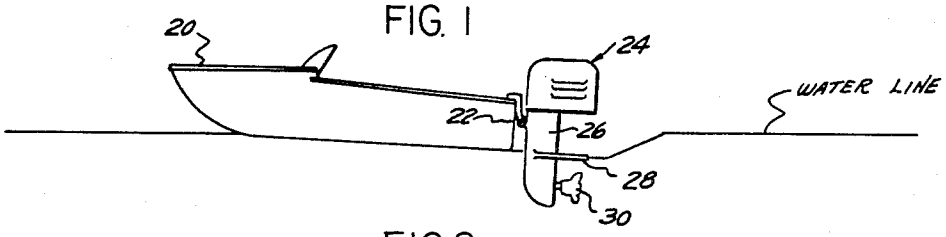


FIG.2

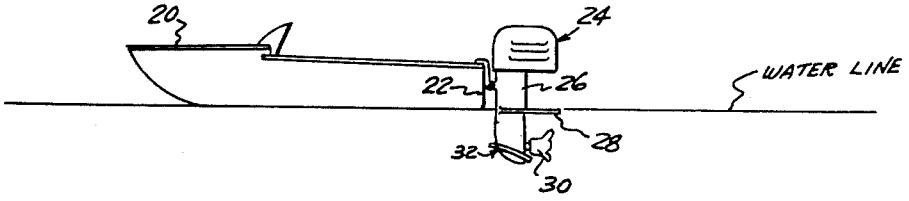


FIG.5

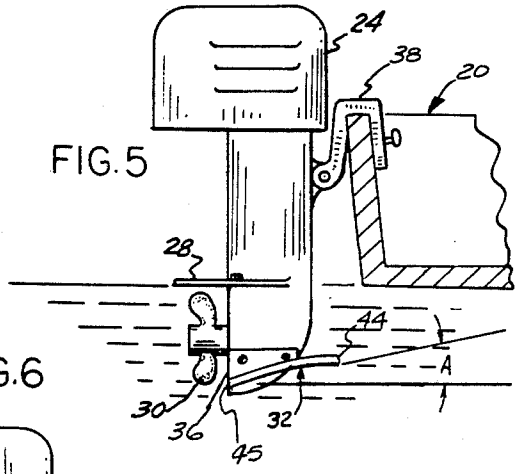


FIG.3

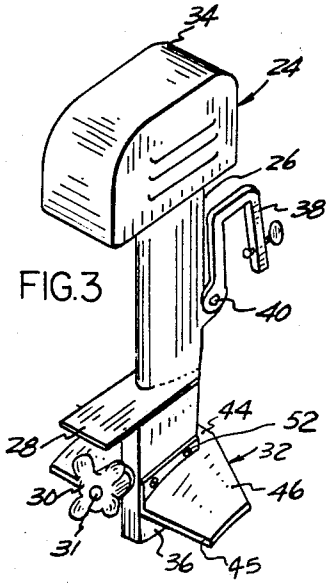


FIG.6

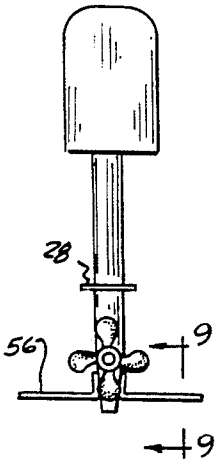


FIG.7

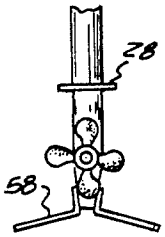
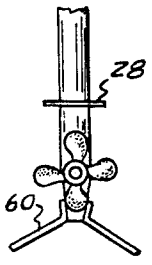


FIG.8



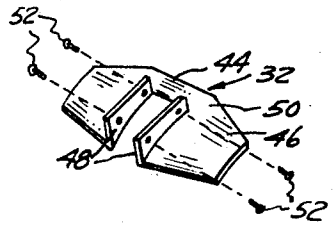


FIG.4

FIG.9

FIG.10

FIG.11

INVENTOR
CHARLES W. POOLE

BY Hauke, Braun, & Gifford
ATTORNEYS

United States Patent Office 3,433,195
Patented Mar. 18, 1969

3,433,195

HYDROFOIL DEVICE FOR OUTBOARD MOTORS

Charles W. Poole, Livonia, Mich.
(1426 Pleasant View Drive, Redlands, Calif. 92373)

Filed Aug. 23, 1967, Ser. No. 662,734
U.S. Cl. 114—66.5 9 Claims
Int. Cl. B63h 21/26; B63b 1/24

ABSTRACT OF THE DISCLOSURE

A lift and stabilization device for use with stern-drive motors wherein the driveshaft housing has integral or detachable fins positioned on the skeg portion of the housing to provide a hydrofoil effect that enables the boat to assume a horizontal attitude while stabilizing the boat in the water.

BACKGROUND OF THE INVENTION

Field of the invention

This invention relates to boat motors and more particularly to hydrofoil and stabilizer means for stern-drive motors such as outboard motors, inboard-outboard motors or the like.

Description of the prior art

The state of the prior art teaches the use of planing members on stern-drive motors to plane the surface of the water at speeds that maintain the motor gear case out of the water when used with hydrofoil type water craft.

Still other outboard motor installations provide for the use of fin-like planing members attached to the motor support member for imparting stability to the boat with the fin riding substantially on the surface of the water. Patent No. 2,967,503 discloses a lift device for attachment to a boat directly beneath its center of gravity which is the balance point of the boat with its motor. The prior art does not suggest the incorporation of a lifting device or hydrofoil on a stern-drive motor as disclosed in the present invention, which provides advantages that will become evident from the following specification.

SUMMARY

The preferred embodiment of the present invention is described in connection with a conventional outboard motor. Outboard motors are generally provided with horizontal anti-cavitation plates which are cast integrally with the housing. The purpose of the cavitation plate is to reduce the erosion of the propeller caused by the driving-action of the propeller in the water and thereby provide a more efficient and quieter operation. None of the prior art devices used with outboard motors, however, have solved the problem of providing means cooperating with the cavitation plate to attain a flatter, more horizontal attitude of the boat when powered by outboard motors.

Applicant has devised a unique hydrofoil stabilizer for a stern-drive motor that is positioned on the skeg portion of the housing below the gear case housing and extending rearwardly and downwardly at a height below the water line so as to avoid the water spray from the propeller on its lift or high-pressure face. The advantages of a hydrofoil located as described acts to improve the stability of the boat while additionally imparting an upward force to the hydrofoil member tending to raise the rear portion of the boat out of the water to attain a flatter or horizontal attitude. In addition, applicant's hydrofoil also acts as a propeller guard while handling the motor out of the water while shielding the propeller from floating debris and weed beds when in operation in the water.

It is therefore an object of the present invention to provide a hydrofoil and stabilizer means for a stern-drive

motor to enable the boat to assume a horizontal attitude.

Another object of the invention is to provide fin means for conventional outboard motors that operates to raise the rear end of the boat to increase the operating efficiency and velocity of the boat during forward movement through a body of water.

Still another object of the invention is to provide a device which is adapted for attachment to the skeg portion of conventional stern-drive motors currently in use, and which functions to provide a hydrofoil effect to support the boat at a horizontal attitude while avoiding directing the water spray therefrom to the propeller.

A further object of the invention is the provision of a fin device for outboard motors which can be of different shapes and sections to provide the desired amount of control and lift of the boat.

A still further object of the present invention is the provision of stabilizing and hydrofoil means which acts as a propeller guard when handling the motor out of the water and functions to shield the propeller from weed beds while traversing shallow water.

Still further objects and advantages of the present invention will become readily apparent to one skilled in the art to which the invention pertains upon reference to the following detailed description.

DESCRIPTION OF THE DRAWINGS

The description refers to the accompanying drawings in which like reference characters refer to like parts throughout the several views and in which:

FIG. 1 is a side elevational view of a conventional boat and its outboard motor showing the position of the boat with reference to the water line;

FIG. 2 is a side elevational view of the hydrofoil and stabilizing fin device of the present invention shown mounted on an outboard motor illustrating the preferred position of the boat when in motion in the water.

FIG. 3 is a perspective view of the conventional outboard motor with a hydrofoil attachment constructed in accordance with the present invention;

FIG. 4 is a perspective view of the attachment apart from the motor;

FIG. 5 is a side elevational view of the outboard motor of FIG. 3;

FIG. 6 is the rear elevational view of the outboard motor showing a modification of the invention;

FIGS. 7 and 8 are fragmentary rear elevational views showing further modifications of the present invention;

FIG. 9 is a cross section taken on line 9—9 of FIG. 6;

FIGS. 10 and 11 represent two alternative cross sections which can be used with the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings, a boat **20** includes a transom **22** which carries the outboard motor unit **24** at the rear of the boat to propel the same. The boat and motor depicted in FIG. 1 is the conventional prior art arrangement to illustrate the inclined attitude of the water craft propelled by a conventional outboard motor.

The motor unit **24** includes the driveshaft housing **26** provided with a cavitation plate **28** which is disposed above a propeller **30**. In FIG. 2, wherein like reference characters designate like or corresponding parts, there is shown an outboard motor mounted on boat **20** and equipped with applicant's invention shown generally at **32** which functions as a hydrofoil and stabilizer means to provide the flatter or more horizontal attitude of the boat.

While the hydrofoil member **32** of applicant's invention could be formed or cast integral with the housing **26** the

embodiment described in detail in the application discloses a separate hydrofoil member 32 bolted or otherwise securely affixed to a conventional outboard motor for conversion of the same into a unit that will operate in accordance with the invention.

Turning now to FIGS. 3, 4 and 5, the outboard motor is there shown having a cowl 34 mounted on the upper end of the driveshaft housing 26 for enclosing an engine, not shown, and a conventional skeg portion 36 extending downwardly from the propeller gear case and ahead of the propeller 30 which serves to help protect the propeller against damage. Attachment means comprising a clamp bracket 38 having swivel means 40 is provided as shown in FIG. 3 for attaching the outboard motor 24 pendantly to the transom 22 of the boat.

The hydrofoil and stabilizer means of applicant's invention is shown mounted on the skeg portion 36 so as to be positioned below the water line when in operation. The hydrofoil member 32 of the instant embodiment comprises a leading edge central member 44 having a pair of similar and diverging fin-like members 46 so as to extend on either side of the housing 26. A central portion of the member 32 is attached to the skeg portion 36 of the housing by means of upwardly extending plates 48 having securing means such as bolt members 52. As viewed in FIG. 5, the hydrofoil member 32 is shown to have a generally hollow convex configuration with the uppermost leading edge portion 44 positioned in the horizontal plane below the propeller driveshaft 31. The trailing edge 45 of the high-pressure face terminates below the lowermost extent or nadir of the propeller blade path.

By means of the above described arrangement of parts, applicant's member 32 will produce a hydrofoil effect in that it will supply a lift such that, as the speed of the boat increases, the fins 46 will support an increasing proportion of the boat weight until the rear portion of the hull rises and travels adjacent or clear of the water line as shown in FIG. 2. By virtue of applicant's location of his foil 32 such that the turbulent water therefrom will be directed beneath the propeller blades, he is thereby assured that his member 32 will not subject the propeller to cavitation and vibration.

Although the conventional horizontal hydrofoil systems employ automatic controls through which the angle of the foil may be adjusted in response to changes in pitch, heel, and elevation of the boat, applicant's concept of mounting the horizontal hydrofoil directly to the housing of the motor eliminates the need for any separate adjustment means. This is due to the fact that the angle of attack of the foil 32 indicated by A in FIG. 5, can be varied by means of conventional adjustment of the motor on swivel means 40 to provide an increase in lift. It is to be understood however, that applicant's concept does not preclude the use of an independent control system for adjustment of the angle of attack of his hydrofoil to allow for changes in pitch, heel and elevation of the craft, if required without departing from the scope of the invention.

It should be noted that in the embodiment shown in FIG. 5 the fins 46 extend in a horizontal attitude with respect to the direction transverse to the axis of the propeller shaft, indicated at 31 in FIG. 3. Also it will be appreciated that the hollow convex cross section of the fins 46 could be replaced with various cross sections such as shown in FIGS. 9, 10 and 11, for example .

FIGS. 6, 7 and 8 show modified forms of applicant's invention wherein the hydrofoil fin portions are formed at various attitudes to achieve the desired amount of control.

As shown in FIGS. 9, 10 and 11, the hydrofoil fins could have various cross sections such as the flat plate, curved plate and airfoil shapes, respectively, without departing from the scope of applicant's invention.

It should be understood, of course, that the foregoing disclosure relates only to preferred embodiments of the invention and that numerous modifications or alteration may be used therein without departing from the spirit and scope of the invention as set forth in the appended claims.

What is claimed is:

1. A stern-drive motor unit including an engine, a housing extending downwardly therefrom enclosing a drive-shaft in the water operatively connected to a transverse propeller shaft to drive a propeller thereon, a skeg portion carried by the housing positioned below the propeller shaft, a lifting and stabilizing device comprising:
   (a) a hydrofoil means on said housing disposed below said propeller shaft,
   (b) said hydrofoil means having a leading edge portion extending forwardly of said housing wherein a hydrofoil effect is achieved to maintain the boat in a substantially horizontal attitude.

2. The structure as defined in claim 1, wherein said hydrofoil means comprises fins having a hollow convex configuration in cross section.

3. The structure as defined in claim 2, wherein said fins are formed integral with said housing.

4. The structure as defined in claim 1, wherein said hydrofoil means comprises fins extending in a horizontal attitude transverse to the axis of the propeller.

5. The structure as defined in claim 1, wherein said hydrofoil means comprises fins having an airfoil configuration in cross section.

6. The structure as defined in claim 1, wherein said hydrofoil means comprises fins having a flat plate configuration in cross section.

7. The structure as defined in claim 1, wherein said hydrofoil means comprises fins such that the trailing edge portion thereof are located below the lowermost extent of the path of the propeller.

8. The structure as defined in claim 1, wherein said hydrofoil means comprising fins extending in a downwardly inclined attitude transverse to the axis of the propeller.

9. The structure as defined in claim 1, wherein
   (a) said hydrofoil means comprises a single plate member having a central slot portion formed therein, substantially equal to the width of said housing at said skeg portion,
   (b) substantially vertical flange members on said plate at each side edge of said slot, and
   (c) each of said flange members having securing means for attaching said hydrofoil means to said skeg portion.

References Cited

UNITED STATES PATENTS

1,549,564	8/1925	Slocum	114—66.5
2,584,347	2/1952	Hazard	114—66.5

ANDREW H. FARRELL, *Primary Examiner.*