May 7, 1957 C. D. STRANG 2,791,196

OUTBOARD MOTOR WITH PLANING SURFACE

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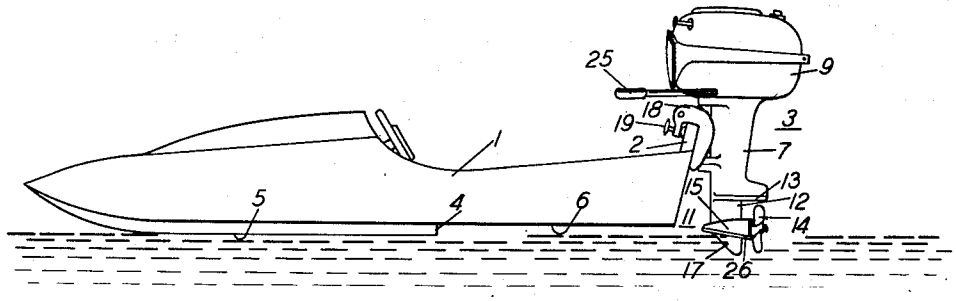


FIG. 1.

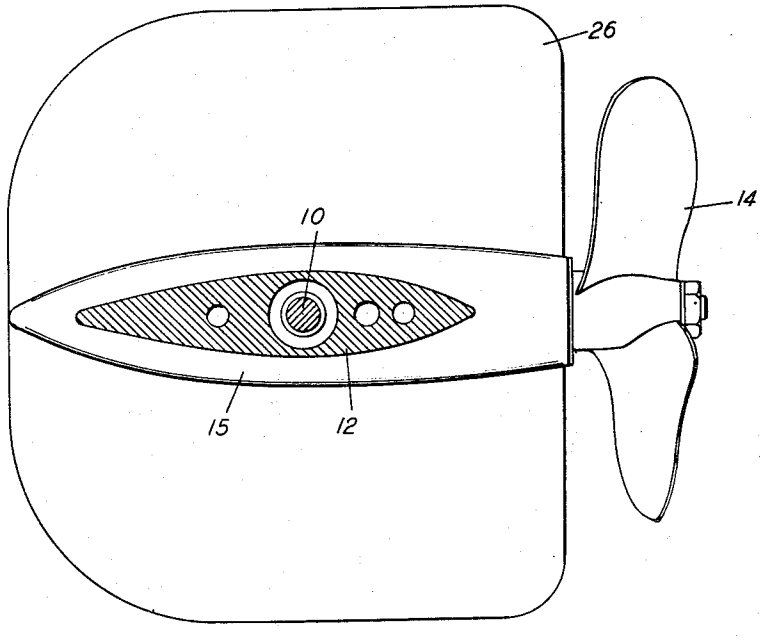


FIG. 3.

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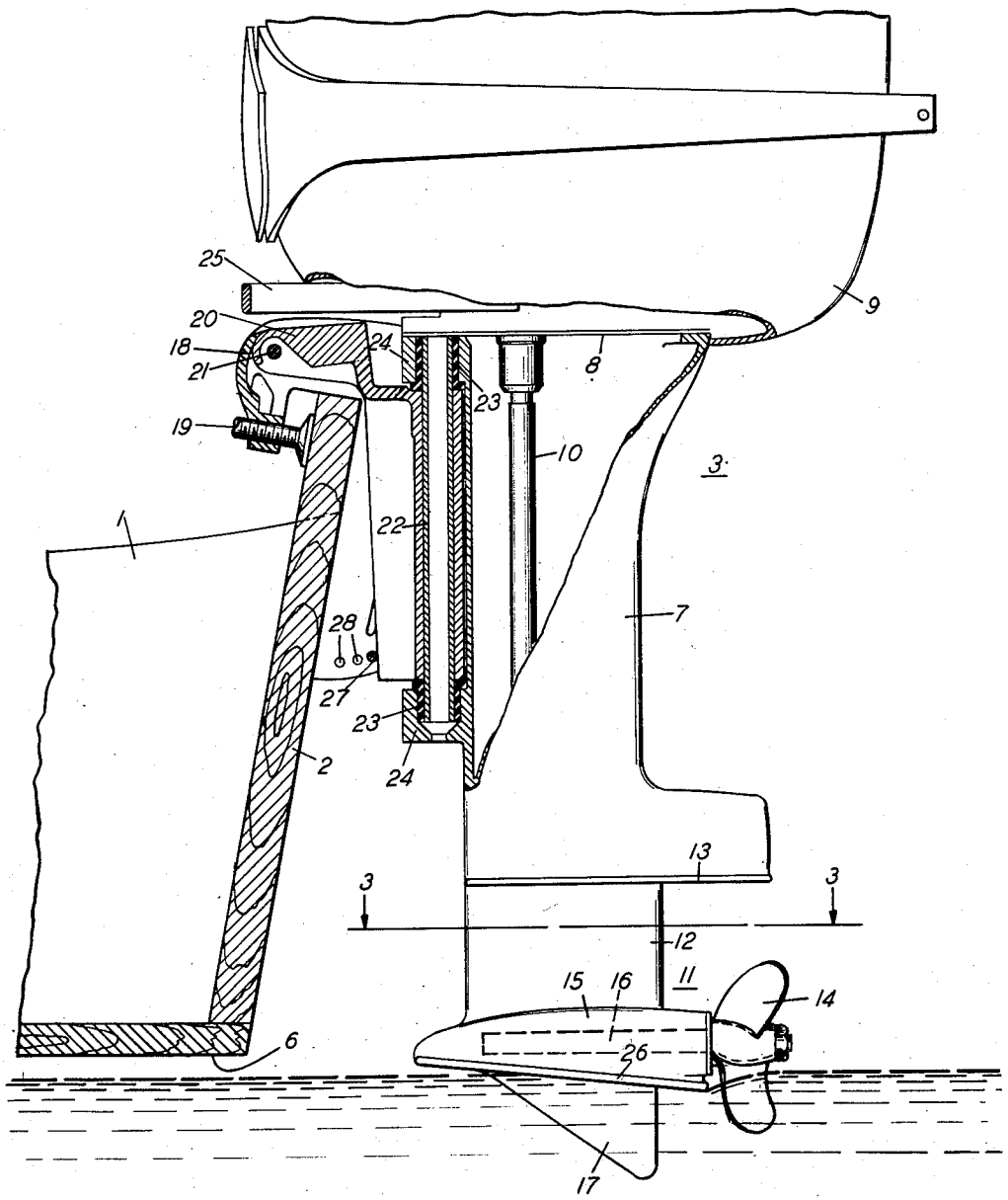


FIG. 2.

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OUTBOARD MOTOR WITH PLANING SURFACE

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Application April 18, 1955, Serial No. 501,906

2 Claims. (Cl. 115—17)

This invention relates to outboard motors particularly for boats which operate on the principle of the hydroplane.

According to the invention, a dirigible planing surface is disposed to ride on the surface of the water and hydrodynamically support the rear of the boat.

More specifically the invention comprises an outboard motor unit having a streamlined gear case at the lower end of the motor and provided with the planing surface beneath the gear case and immediately in front of the propeller angularly disposed to ride on the surface of the water and to hydrodynamically support the rear of the boat out of the water and the propeller a given distance in the water.

The propeller is carried at the rear of the gear case on a substantially horizontal shaft journally supported within the gear case and driven by the engine. The motor unit including the gear case and propeller is dirigible with respect to the boat to effect directional control of the boat, and the angularly disposed planing member formed integrally with the gear case is dirigible therewith.

The object of the invention is to support the boat with a minimum of drag.

The drawings furnished herewith illustrate the best mode of carrying out the invention as presently contemplated and set forth hereinafter.

In the drawings:

Figure 1 is a side elevation showing the motor and boat in the position in which the boat is supported at planing speeds;

Fig. 2 is an enlarged side elevation partially in section of the motor unit and transom end of the boat and with one supporting clamp of the motor removed; and

Fig. 3 is a sectional view taken on line 3—3 of Figure 2.

The boat 1 shown in the drawings includes the transom 2 which carries the outboard motor unit 3 at the rear of the boat to propel the same and includes the step 4 located slightly forwardly of the center of gravity of the boat and intermediate the forward and rearward planing under-surfaces 5 and 6, respectively. Boat 1 is of the hydroplane type wherein the boat is supported independently of its normal displacement above certain speeds by the dynamic reaction of the water to the movement of the planing surfaces.

The outboard motor unit 3 as shown includes the hollow drive shaft housing 7 having an open upper end supporting the base of the engine 8 which is enclosed by the cowl 9 and connected by the drive shaft 10 to the lower propeller unit 11.

The lower propeller unit 11 includes the streamlined strut 12 secured to the lower end of housing 7 beneath the horizontal plate 13 which extends rearwardly over the propeller 14. The enlarged streamlined torpedo-shaped gear case 15 of the lower unit 11 is disposed forwardly of the hub of the propeller and encloses the gears, not shown, which drivingly connect shaft 10 and the propeller shaft 16, indicated by dotted lines. Propeller 14 is disposed rearwardly on shaft 16. The skeg 17

extending downwardly from gear case 15 ahead of propeller 14 serves to protect the propeller against damage by objects in the water passing beneath the boat.

Motor unit 3 is secured to boat 1 by the bracket assembly which includes the two laterally spaced clamps 18 provided with the turn screws 19 for fastening to the upper end of transom 2 of the boat. The tilt-bracket 20 is carried by and between clamps 18 on the pin 21 for pivotal movement on a transverse axis respecting the boat, and is provided with the vertical swivel pin 22 having upper and lower ends fitted with the cushion elements 23. The upper and lower lugs 24 formed integrally with housing 7 and forwardly thereof are mounted on cushion elements 23 and support the motor unit 3 for pivotal movement as by the tiller 25 on a vertical axis for the directional control of the boat.

According to the invention, the planing member 26 having a forward angle of incidence for lifting and the positive support of the rear of the boat is fixed beneath gear case 15 so as to be both adjustable and dirigible with the motor unit on the tilt pin 21 and swivel pin 22, respectively.

The adjustment of the motor unit 3 on pin 21 allows the angularity of the propeller shaft and the direction of thrust of the propeller to be changed in either direction from the normal horizontal shown in the drawings. Adjustment of the motor unit 3 on pin 21 from the position shown so that the thrust of the propeller is directed upwardly will effect a greater lifting of the rear of the boat and effects a corresponding increase in the angle of incidence of member 26 to provide a corresponding increase in lift as desired. The desired angular adjustment of the motor unit 3 is maintained by the cross bolt 27 which is selectively disposed in corresponding opposite holes of the series of holes 28 in the lower rear portions of the clamps 18 and to be engaged by tilt bracket 20 which limits movement of the motor unit on pin 21 in one direction only. The pivotal movement of the motor unit allowed in the other direction permits the motor to tilt and the lower end to pass over a submerged object, or to be raised from the water. In the operation of the motor the forward thrust of the propeller is received by bolt 27 which normally maintains the motor unit in the selected position of adjustment.

The adjustment of motor unit 3 on the vertical axis of pin 22 determines the direction of thrust of the propeller and the direction of movement of the boat. In the course of turning, the actual movement of the boat includes a sideward component and does not correspond to the directional lines of the boat. The position of planing member 26 is changed with steering movement of motor unit 3 so that the forward angle of incidence is altered toward the outside of the turn and member 26 faces in the direction of the actual movement referred to.

Motor unit 3 is secured to boat 1 so that planing member 26 supports the boat with rear undersurface 6 clear of the water and so that member 26 with the forward undersurface 5 of the boat provides the entire support of the boat at planing speeds. Member 26 also maintains gear case 15 out of the water at planing speeds. Member 26 has a rear, trailing edge located immediately in front of propeller 14 and extends beneath propeller shaft 16 so that only the lower blades of the propeller are submerged at the planing speeds referred to. The proximate relationship of member 26 and propeller 14 provides the support of the propeller at the same depth in the water at all times and generally regardless of up to moderate waves and swells. While the invention is not intended for particularly rough water the member may drop below the level of the water momentarily, as in rough water, without causing undue drag because of

the relatively small area required for the normal support of the rear of the boat when such support is adjustable as described and is dirigible to correspond at all times generally with the direction of actual movement of the boat.

Various modes of carrying out the invention are contemplated as within the scope of the following claims particularly pointing out and distinctly claiming the subject matter which is regarded as the invention.

I claim:

1. In an outboard motor unit including a powerhead, a substantially vertical housing supporting the powerhead, a gear case fixed to the lower end of the housing, a propeller shaft journally supported within the gear case and being driven by said power head, and a clamp bracket assembly for securement to a boat and pivotally connected to the housing for steering movement of the unit to effect the directional control of the boat; a planing member integral with the gear case and dirigible therewith provided immediately forward of the propeller, said member having a lower planing surface disposed angularly and beneath the gear case to plane the surface of the water at planing speeds and maintain the gear case and rear of the boat out of the water with the propeller a given distance in the water.

2. In an outboard motor unit for securement to a boat, a powerhead, a substantially vertical housing supporting the powerhead, a gear case fixed to the lower end of the housing, a propeller shaft disposed within the gear case and being driven by said powerhead, a propeller disposed rearwardly on said shaft, and means disposed beneath said gear case and forwardly of the propeller to support the gear case and the rear end of the boat out of the water at planing speeds to minimize drag, said means being inclined and having a trailing portion extending beneath said propeller shaft so that only a portion of the propeller is submerged at planing speeds.

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