

[54] PROPELLER ASSEMBLY

[72] Inventor: Wayne Dunham, P.O. Box 22719, Fort Lauderdale, Fla. 33315

[22] Filed: Sept. 10, 1970

[21] Appl. No.: 71,049

[52] U.S. Cl. ....115/34 R

[51] Int. Cl. ....B63h 5/08

[58] Field of Search.....115/34, 35, 37, 49, 50

[56] References Cited

UNITED STATES PATENTS

685,591	10/1901	Fernez et al.....	115/17
2,357,084	8/1944	Cleofe.....	115/49 X
2,391,109	12/1945	Patten .....	115/49
3,327,674	6/1967	Schwarzer .....	115/49 X

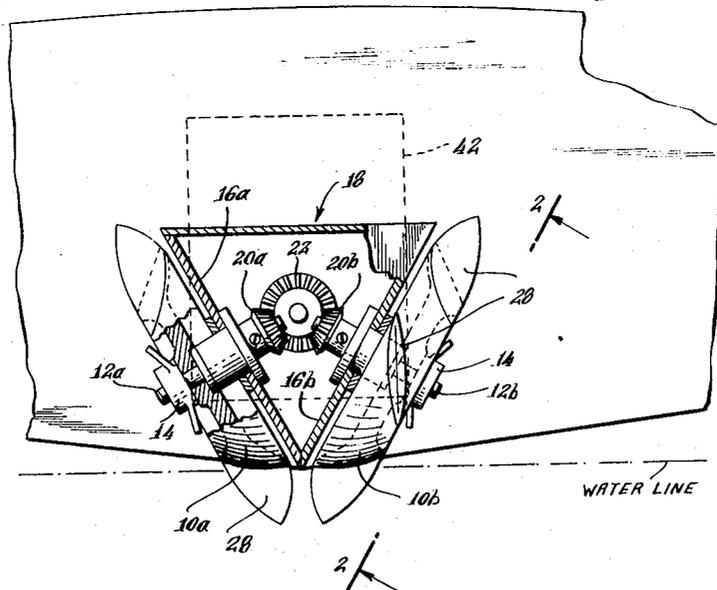
Primary Examiner—Milton Buchler  
Assistant Examiner—Carl A. Rutledge  
Attorney—John W. Hoag

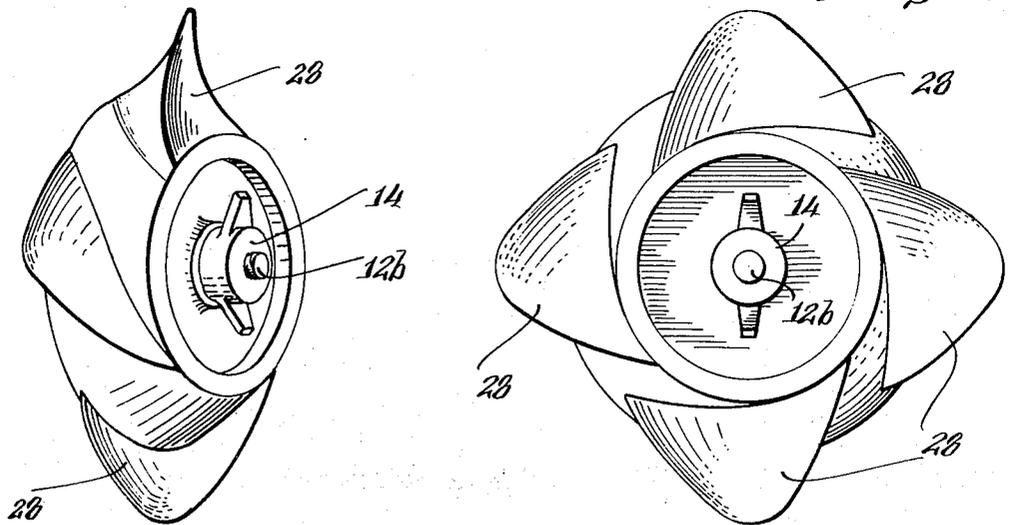
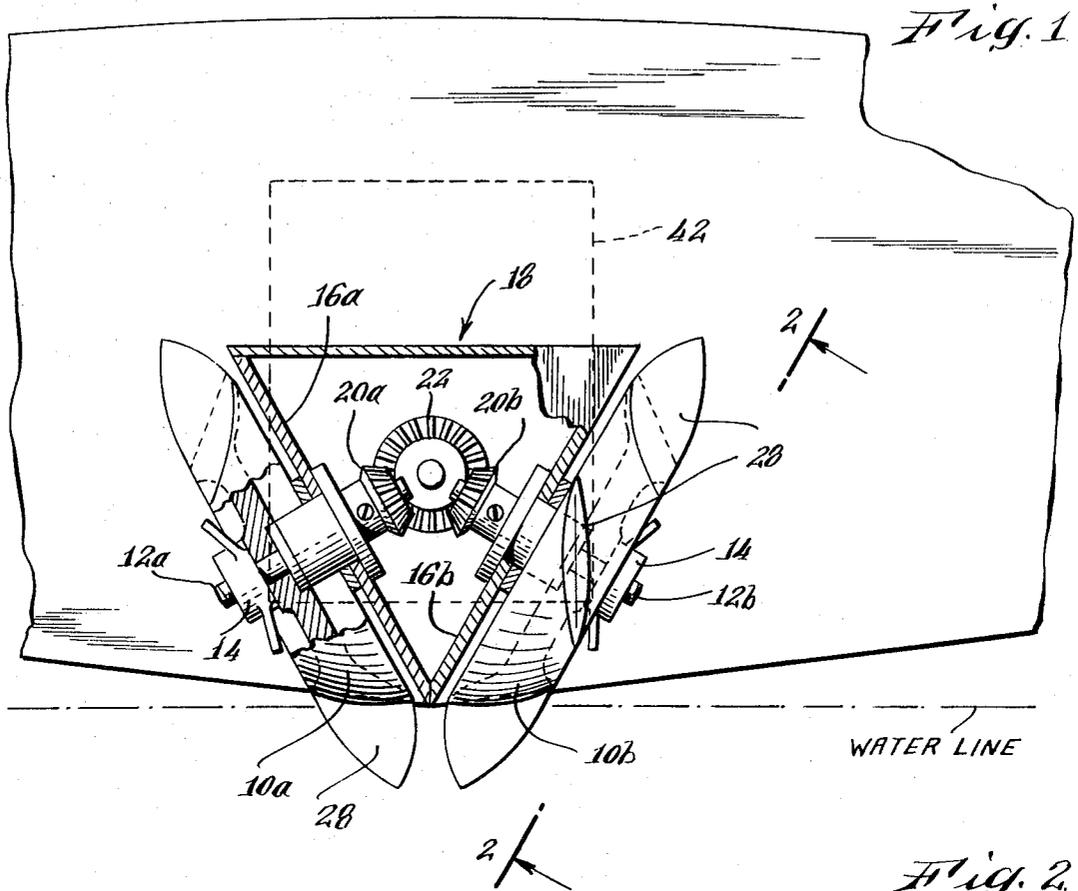
[57] ABSTRACT

A propeller assembly comprises a plurality of hubs mounted for rotation on an axis which is transverse to the direction of movement of the boat, each hub having a plurality of radially extending blades which are curved and present crowned, convex surfaces to the water. The assembly is disposed, either within the boat or attached to the rear transom, so that when the boat is in motion the hubs are tangent to the surface of the water and press down on the surface of the water, and the blades slide into, and out of, the water endwise.

The blades on the hubs of a pair of hubs are opposed and angularly related one to the other so that they impel water inwardly toward one another and back, or outwardly away from one another and back, but not upwardly.

2 Claims, 7 Drawing Figures





*Fig. 3.*

INVENTOR  
Wayne Dunham

Fig. 4.

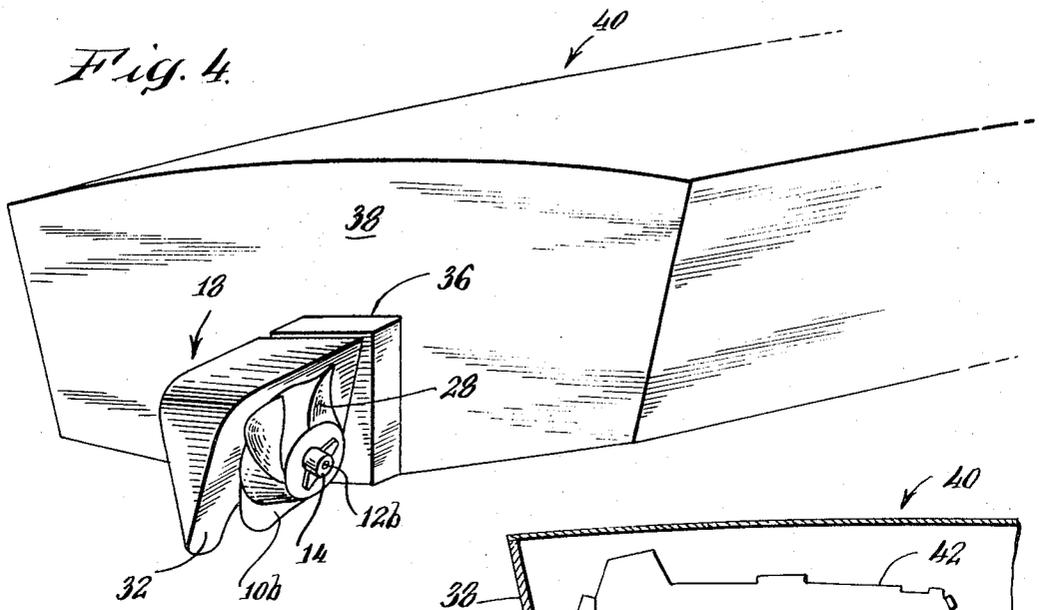


Fig. 5.

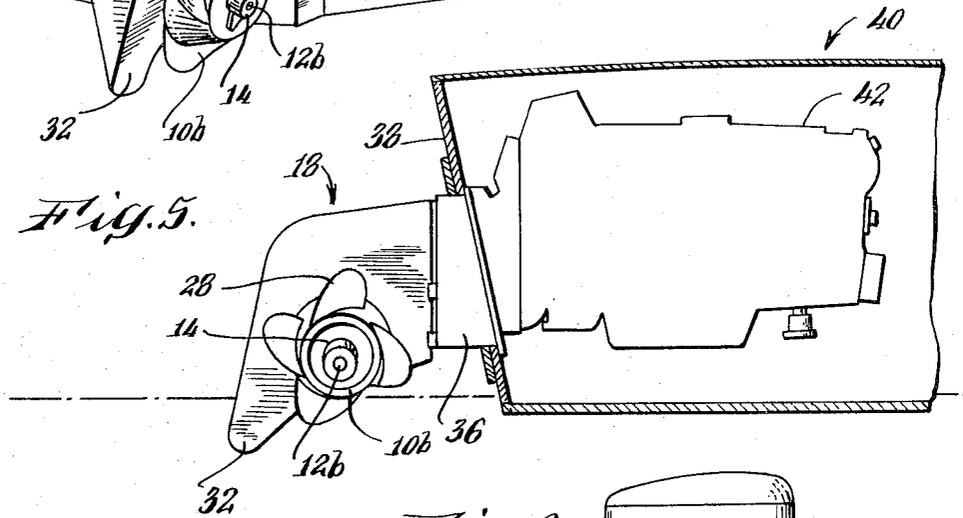
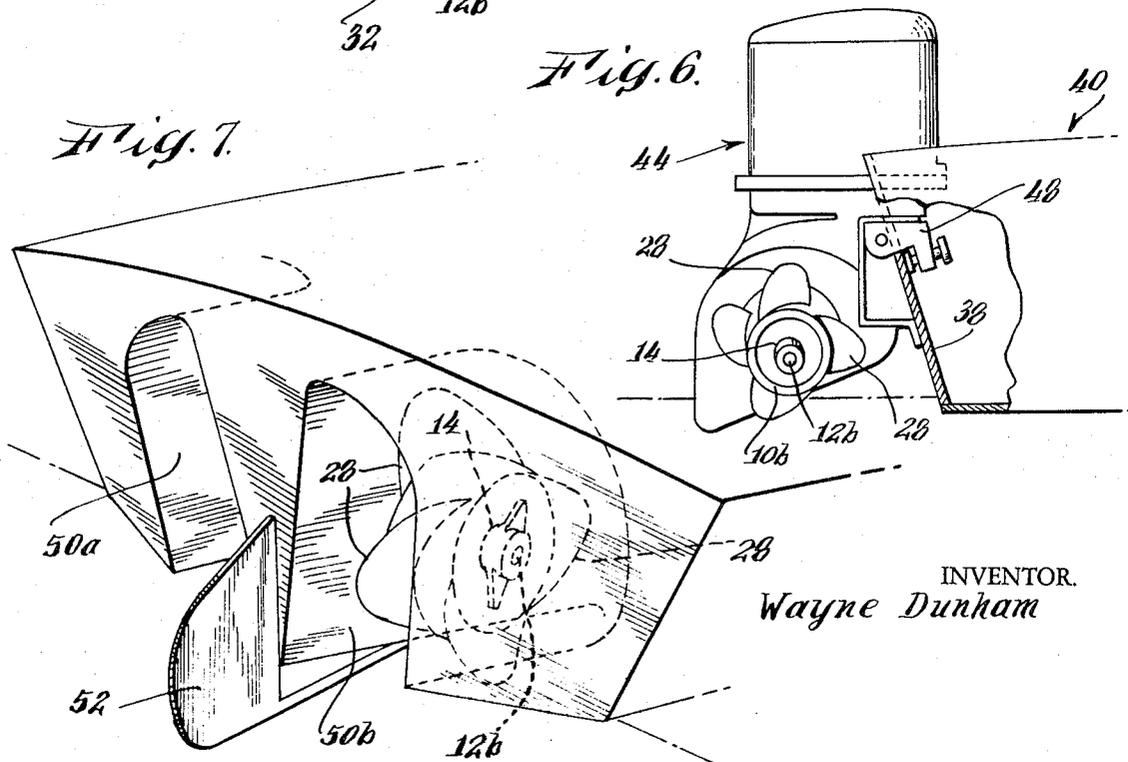


Fig. 7.



INVENTOR.  
Wayne Dunham

## PROPELLER ASSEMBLY

## FIELD OF THE INVENTION

This invention relates to a propeller assembly for driving boats, and particularly racing boats known as "three point hydros". The propeller means can be adapted to inboard and outboard and inboard-outboard power plants.

At the present time the world's fastest propeller driven boats when under way, ride on their sponsons and one-half of their surfacing propellers. The propellers are of conventional form and rotate around an axis parallel to the direction of travel of the boat. This arrangement is unsatisfactory and inefficient because the disposition of the propeller blades produces only a limited forward thrust. The propeller means of earlier boat power plants was even more unsatisfactory because the propeller shaft, bearings and supporting struts, extend into the water and are a drag on the boat and the forward thrust of the blades is opposed by the thrust of the blades as they enter and leave the water.

An object of the invention is to provide propeller means for boats which will reduce the wetted surface and parasitic drag and thereby make possible increased speed power output.

Another object of the invention is to lessen friction, heat and power loss by providing propeller means without underwater shafts, bearing and struts and all underwater non-working machinery.

Another object of the invention is to provide propeller means such that a hub and blades assembly may be readily removed from its mounting shaft and replaced by another such assembly.

## SUMMARY OF THE DESCRIPTION

The propeller means comprising a propeller assembly resemble the rear wheels of an automobile in that they are driven in coordinated pairs from differential type gearing and rotate longitudinally rather than laterally of the vehicle. Each propeller means comprises a hub mounted for rotation on a driven shaft and having a plurality of radially projecting blades which are each curved and positioned so that the crowned convex surfaces of the blades contact the water, the blades entering and leaving the water at an angle to reduce to a minimum any thrust counter to their forward thrust delivered while immersed in the water.

Boats of the kind for which the disclosed propeller is intended have very little draft and when moving tend to ride up so that the boat planes over the water. The propeller assembly disclosed herein is supported, with the propeller means either disposed within one or more wells within the boat, or attached to the outside of the boat transom, or supported at the lower end of an outboard motor attached to the transom, in such a way that when the boat planes over the water the hubs of the propeller members will be substantially tangent to, and riding on, and pressing down on, the surface of the water.

Preferably the propeller members are mounted so that their opposed blades will be angularly related and will impel water inwardly toward one another and back, or outwardly away from one another and back, but not up upwardly.

## DESCRIPTION

The propeller means which is the subject of this invention may be used with, and form part of, inboard, outboard and inboard-outboard power plants. Since this invention relates only to the propeller means and not to the structure of the boat or motor with which it is employed the latter are not described in detail.

However, the invention will best be understood by reading the following description in connection with the drawings, which illustrate the propeller means in association with inboard, outboard, and inboard-outboard power plants, and in which;

FIG. 1 is a rear end elevation of a propeller assembly embodying the invention, looking at the stern transom of a boat employing the assembly,

FIG. 2 is a view taken on the lines 2—2 of FIG. 1,

FIG. 3 is similar to FIG. 2 but is a perspective view looking at one of the propeller members from a 30° angle,

FIG. 4 is a perspective view showing the propeller assembly employed as part of an inboard-outboard installation,

FIG. 5 is a side elevation of the embodiment shown in FIG. 4,

FIG. 6 is a side elevation of the assembly employed as part of an outboard motor, and

FIG. 7 is a perspective view showing the rear end of a boat provided with downwardly opening wells in which the pair of hub and blade members comprising the assembly are respectively mounted.

In the embodiment of the invention illustrated in FIG. 1 a pair of hubs  $10_a$  and  $10_b$  are shown mounted adjacent the outer ends of shafts  $12_a$  and  $12_b$ , held in place by the quick release nuts 14. Shafts  $12_a$  and  $12_b$  extend through, and are mounted by, the angularly related, downwardly and inwardly inclined walls  $16_a$  and  $16_b$  of a housing 18. At the inner ends of shafts  $12_a$  and  $12_b$  respectively are the bevel gears  $20_a$  and  $20_b$  which mesh with the ring gear 22 carried by a drive shaft 24, which may comprise part of a known power plant suitable for the boat in connection with which the propeller means is employed.

Projecting radially from hubs  $10_a$  and  $10_b$  respectively are the blades  $26_a$  and  $26_b$ , which, as will be seen by reference to FIGS. 2 and 3, are each curved longitudinally and laterally and the crowned convex surface 28 of each blade is its leading surface. Two or more blades are carried by each hub and the inner ends of the blades are angularly related to the periphery of the hub somewhat like successive turns of a spiral thread.

The blades on one hub are disposed in opposed relation to the blades on the other hub and the blades of opposed pairs of blades are oppositely inclined so that the forward thrust of the blades in the water displaces water rearwardly and laterally toward one another. The curvature of the blades, best seen in FIG. 3, is such that the leading edge 30 of each blade projecting radially from it will enter and exit from the water substantially parallel with the direction of movement of boat being driven by its propeller, much in the way a skilled canoeist will "feather" his paddle to make it enter and leave the water without splashing and to prevent the smoothness and power of the forward thrust of the paddle being lessened and impaired as would be the case if

the paddle were held broadside to the water during its entrance into, and exit from, the water. The result of this blade structure substantially prevents the blades from displacing water downwardly as they enter the water, and from lifting water as they leave the water, without impairing the thrust of the blades on the water as they are moving substantially parallel with the surface of the water. This result promotes efficiency and increases the speed potential of the boat both because the forward thrust of the blades is not lessened by an upward thrust having opposing force components, and by maintaining the smooth even riding of the boat which would be impaired by the turbulence and rocking motion occasioned by a blade striking the water broadside as it enters the water and lifting water as it exits from the water.

As is illustrated in FIGS. 4-7 as well as in FIG. 1 propeller assembly is mounted inside or outside a boat at a level such that when the boat planes over the water the peripheries of the hubs will be substantially tangent to the surface of the water and the blades will each move successively through air and water during each rotation of the hub. The periphery of the hubs may be inclined outwardly and toward their axes, as indicated by numeral 32 in FIGS. 1 and 4, to compensate for the inclination of shafts 12<sub>a</sub> and 12<sub>b</sub> and present a surface which will be flat and parallel with the surface of the water, and will tend to ride on the surface of the water while rotating with said shafts, and press down on the surface of the water.

In the embodiment of the invention illustrated in FIG. 4 the triangular shaped housing 18 is extended rearwardly and downwardly below the propeller assembly, the extension 32 serving both to protect the propeller assembly in shallow water and to serve as a rudder. As shown in FIG. 5 the housing 18 is hinged as indicated at 34, to means 36 projecting rearwardly from the rear transom 38 of a boat 40 within which is an engine 42 of known kind.

In FIG. 6 a propeller assembly embodying the invention is shown incorporated in an outboard motor 44 of known kind which is attached to the rear transom by conventional clamp means 46 pivotally connected to the outboard motor by pivot 48 so that the motor assembly including the propeller means may be pivoted to lift the propeller means in conventional manner, as when in shallow water.

FIG. 7 illustrates an inboard installation in a boat

having two upwardly opening walls 50<sub>a</sub> and 50<sub>b</sub>. It will be understood that a propeller number comprising a hub and radially projecting blades will be mounted in each well on opposite sides of a rudder 52 with the periphery of the hubs disposed at the level of the water.

Because the hubs 10<sub>a</sub> and 10<sub>b</sub> are mounted outside the housing 18 they are readily available and an injured hub and blades member may be quickly replaced with a similar uninjured member, this action being facilitated by the use of the quick release nuts 14.

There has thus been provided a propeller assembly for boats in which the above mentioned objects are attained in a simple and practical way.

What I claim is:

1. A propeller assembly for a boat having a longitudinally extending drive shaft with a ring gear thereon, which comprises, a plurality of shafts having at their inner ends respectively beveled gears which mesh with the ring gear, said shafts being inclined downwardly and outwardly from the center of the ring gear, a pair of hubs mounted on said shafts respectively, the said shafts being disposed so that the hubs extend substantially to the water line, each hub having a plurality of radially projecting blades which are curved longitudinally and laterally and define a transversely extending crowned convex surface between leading and trailing edges which are substantially parallel with the boat so that each blade enters and exits from the water substantially parallel with the movement of the boat being driven by the propeller and so that during each rotation of a blade its crowned convex surface becomes its leading surface and acts to push water downwardly and inwardly toward the opposed blade supported on the other hub, the hubs being disposed so that when the boat planes over the water the peripheries of the hubs are substantially tangent to the surface of the water and the blade means on the hubs converge downwardly toward one another.

2. The structure claimed in claim 1, in which the ring gear of the drive shaft is disposed within a housing having downwardly and inwardly inclined walls, the hubs are disposed substantially parallel with the downwardly and inwardly inclined walls of the housing, and the blades which project from one hub act during each rotation to push water laterally toward and under the other hub and against the blade means projecting from the other hub.

\* \* \* \* \*

50

55

60

65