United States Patent

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[54] **BOAT WITH SECONDARY PROPULSION MEANS**
8 Claims, 5 Drawing Figs.

[52] **U.S. Cl.** **115/41,** 115/17, 115/37, 115/18, 114/153
[51] **Int. Cl.** **B63h 5/06**
[50] **Field of Search** 115/41, 35, 34, 37, 18, 17; 114/153; 9/1.5

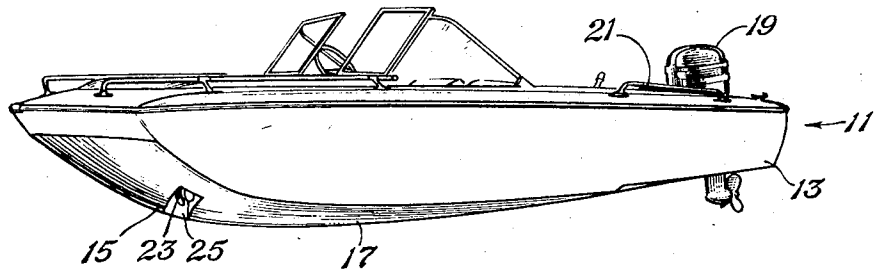
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ABSTRACT: This specification discloses a pleasure boat characterized by having, in addition to a primary propulsion and guidance means, a retractable secondary propulsion and guidance means extendible downward through the hull of the boat into the water for operation at low speeds via a well that is located in the hull outside, normally forward, of the planing surface so as to be out of the water at cruising speeds. The pleasure boat described has a hull adapted to operate with a draft surface in the water at low speeds and to operate with a planing surface less than the draft surface in the water at cruising speeds. In one embodiment, the well is disposed slightly to one side of the keel line of the boat. Specific equipment and arrangements are described.



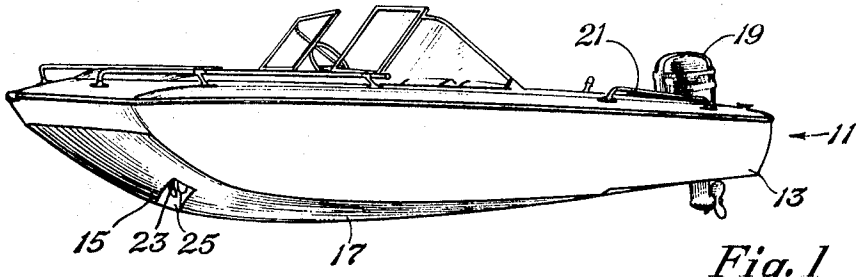


Fig. 1

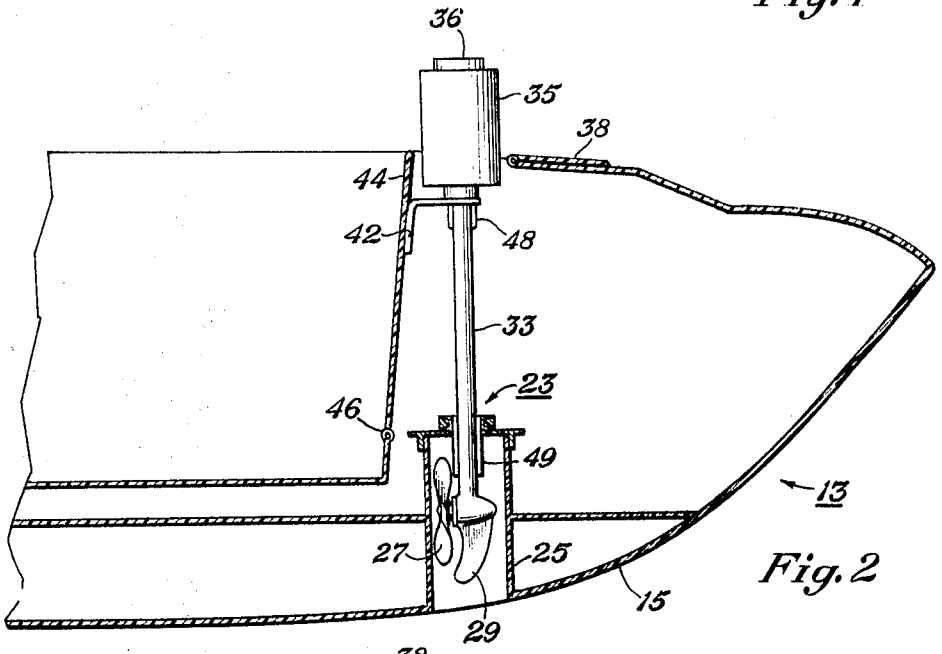


Fig. 2

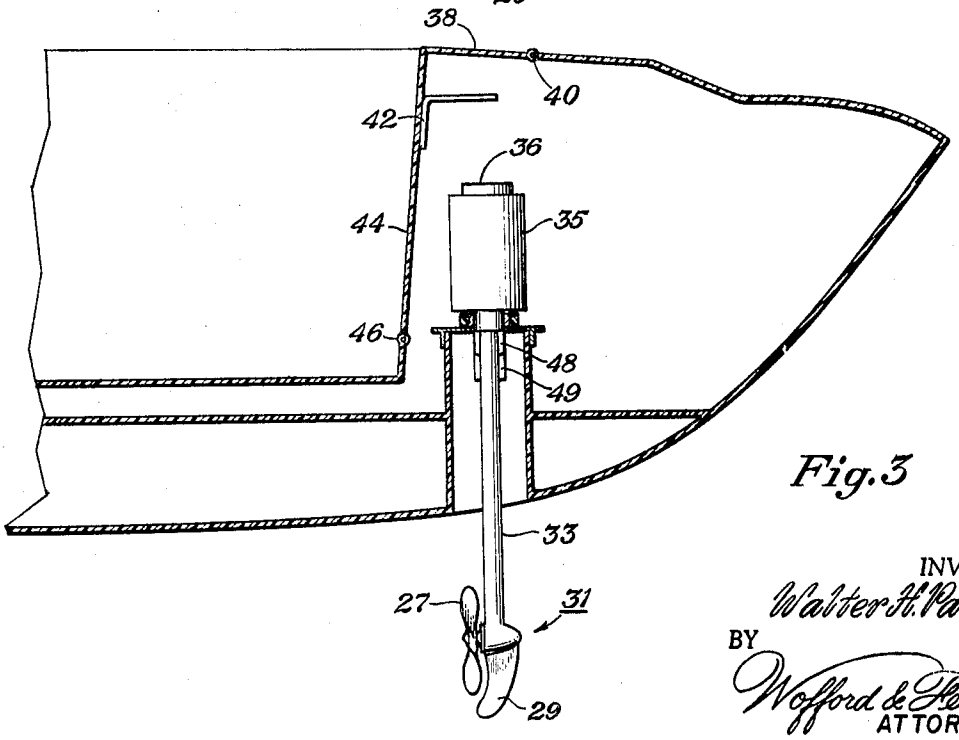


Fig. 3

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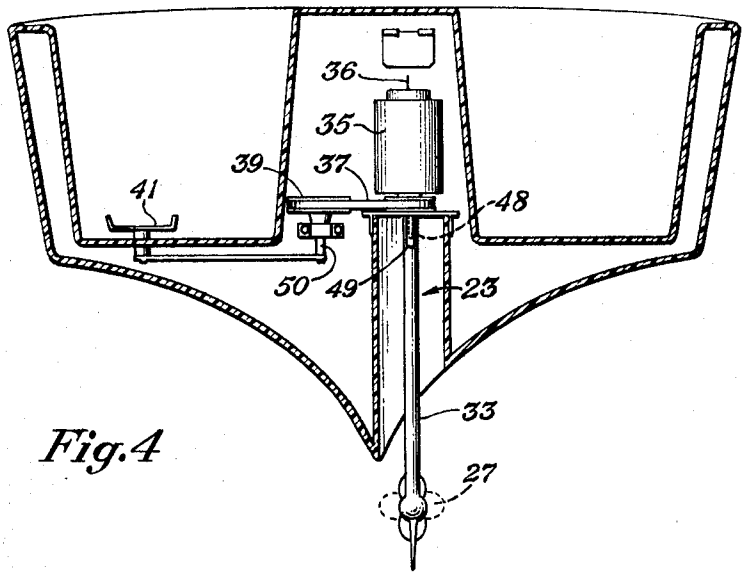


Fig.4

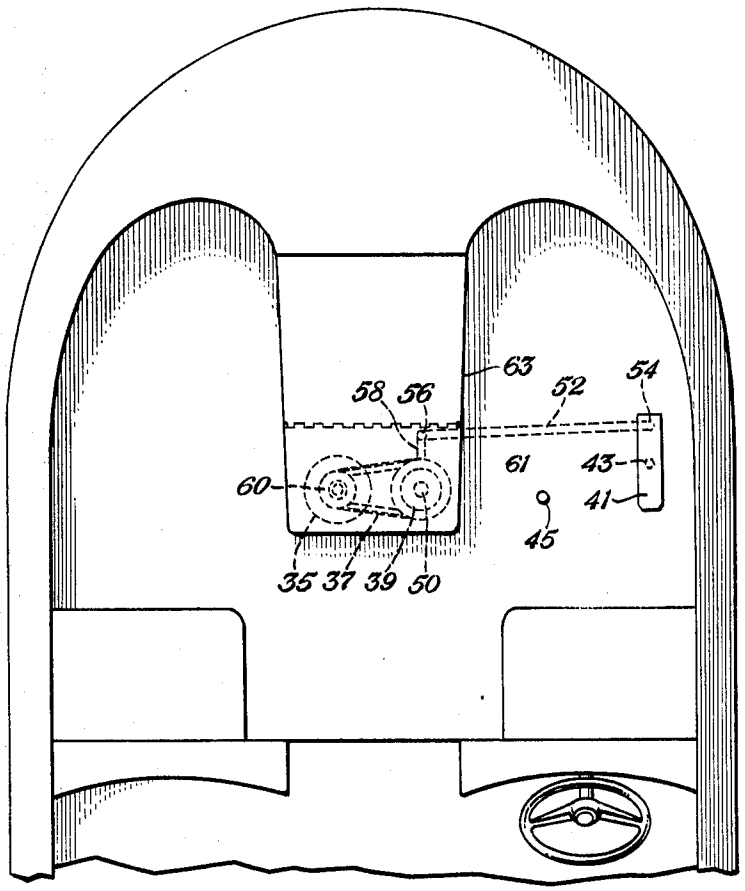


Fig.5

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BOAT WITH SECONDARY PROPULSION MEANS

BACKGROUND OF THE INVENTION:

1. Field of the Invention

This invention relates to pleasure boats. More particularly, it relates to pleasure boats such as may be employed in fishing wherein a supplemental, or secondary, propulsion and guidance means may be used, as in trolling.

2. Description of the Prior Art

It is known to employ small trolling motors on fishing boats. The trolling motors have been employed in conjunction with the usual outboard motor or have been employed as a replacement for the outboard motor at the stern of the boat.

The prior art arrangements employing secondary propulsion and guidance means have not been altogether satisfactory. If placed at the rear of the boat, they were unsatisfactory (1) because of the tendency for the propeller at the rear of the boat to foul fishing lines in trolling, and (2) because of the lack of maneuverability and ready placement of the boat in difficulty accessible positions for good fishing, since the propulsion means pushed rather than pulled the boat into position. If placed at the bow, the secondary propulsion and guidance means have been difficulty accessible for withdrawing or for repairing. If placed at the side of the boat, they were inefficient, because they were too far from the centerline, or keel, of the boat. Moreover, the secondary propulsion means were hard to handle if carried in the boat and emplaced once a fishing spot was reached or they protruded from the boat, frequently into the water and imparted drag to the boat during cruising.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side view of a boat employing one embodiment of the invention and illustrating the location of the well in the forward bottom section of the hull.

FIG. 2 is a side cross-sectional view of the well and the forward bottom section of the hull, showing the motor, the propeller and the vertical member in the retracted position.

FIG. 3 is the same as FIG. 2 showing the motor, the propeller and the vertical member in the extended position.

FIG. 4 is a front cross-sectional view of the retractable motor, vertical member, and guidance pulley.

FIG. 5 is a top plan view of the forward portion of the boat showing the foot control facilitating steering of the boat via secondary propulsion and guidance means.

DESCRIPTION OF PREFERRED EMBODIMENT(S)

Referring now to the FIGS. and more particularly to FIG. 1, boat 11 has a hull 13 adapted to operate with a draft surface 15 in the water at low speeds and to operate with a planing surface 17, less than the draft surface in the water at cruising speeds. By "draft surface" is meant the surface of the hull that is in the water when the boat is at full draft in the water, as at rest or low speeds. By "planing surface" is meant the surface of the hull remaining in the water after the hull has planed out, reaching minimum draft in the water, as at cruising speeds. Boat 11 is powered by a primary propulsion means; such as, outboard motor 19, for attaining cruising speeds. Directional control is effected with a primary guidance means; such as, lever 21 with or without flexible connection with a steering wheel; on outboard motor 19.

A retractable secondary propulsion and guidance means 23 is located in well 25 for lowering into the water and pulling the boat at low speeds for trolling or for accurate placement of the boat for fishing. FIG. 2 illustrates well 25 in draft surface 15 of hull 13 more clearly. The secondary propulsion and guidance means 23 is retracted but propeller 27 and shield 29 therefor can be seen although they do not protrude from the well.

In FIG. 3 secondary propulsion and guidance means 23 is illustrated in the extended position. Propeller assembly 31, with its propeller 27 and shield 29, are supported and steered by vertical member 33.

FIG. 4 illustrates, as a torque inducing means connected with and adapted to rotate the propeller, electric motor 35. Electric motor 35 may be a DC motor powered from a storage battery. Any other torque inducing means; such as, an internal combustion engine deriving its power from a hydrocarbon fuel like gasoline; may be employed. Motor 35 is connected with propeller assembly 31 via a shaft and gear arrangement (not shown) inside vertical member 33 and can be raised or lowered to effect the proper position of the propeller assembly into or out of the water.

Bail 36 is provided on motor 35 to facilitate raising and lowering of secondary propulsion and guidance means 23. Referring to FIGS. 2, 3, and 4, a door 38 is provided in the upper deck structure and is hinged about hinge 40 to provide easy access to bail 36 from the top of the deck. By grasping bail 36 the motor 35 can be raised into position. To support secondary propulsion and guidance means in its retracted position, a bracket 42 is affixed to bulkhead 44. Bulkhead 44 is also pivotally mounted about hinge 46 to facilitate access to the secondary propulsion and guidance means or to any associated components.

Beneath motor 35, keys 48 are provided for alignment with keyway slots 49 to facilitate directional control.

A steering system is connected with vertical member 33 for effecting directional control of the propeller assembly 31 when it is in the extended position. As illustrated in FIG. 4, belt 37 from steering pulley 39 may be employed to effect directional control. Pulley 39 is fixed to shaft 50, which is suitably connected by lever arrangements with foot-steering control 41. The lever arrangements are illustrated more clearly in FIG. 5. Therein, lever 52 is connected via pin 54 with foot steering control 41 and via pin 56 with second lever 58 rigidly fixed to shaft 50. Shaft 50 thus rotates steering pulley 39 in response to rotation of foot-steering control 41 about its fulcrum point 43. Steering pulley 39 has a diameter twice as large as pulley 60 which engages vertical member 33 via keys 48 and keyway slot 49 (FIG. 2). Accordingly, with 90° steer of foot-steering control 41, 180° of steer can be imparted to secondary propulsion and guidance means 23. Even with this speed advantage of 2 to 1, the boat steers in about the same direction as foot-steering control 41 is pointed by the foot, affording a good sense of direction in control.

If desired, steering pulley 39 can be four times as large in diameter as inner pulley 60 to afford a full 360° steer. This is ordinarily not desirable since the feel of steer is lost because the secondary propulsion and guidance means is no longer steered in approximately the direction that foot-steering control 41 is pointed.

In another arrangement, a pulley can be rotatably mounted about pivot point 43 to rotate as foot-steering control 41 rotates and by suitable cable linkage with pulley 60 effects a 1 to 1 ratio of steer. In this way, a full 360° of steer is available and yet the boat moves in the direction which foot-steering control 41 is pointed.

Although steering by a foot control is preferred since it facilitates proper placement of the boat without having to interrupt the use of the hands in fishing operations, other embodiments for steering may be employed. For example, a simple lever can be affixed to vertical member 33 to afford steering in the manner that lever 21 steers outboard motor 19. The lever could protrude to the interior of the boat through a slot in the bulkhead.

An on-off switch 45 is provided to supply power to motor 35. In the embodiment illustrated, switch 45 is spring-loaded off and remains on only as long as it is depressed. One foot depresses switch 45 to impart motion to the boat while the other foot maintains directional control through foot steering control 41. A reversing switch 61 is provided on the exterior of bulkhead 63 to enable reverse motion to be imparted to the boat in difficulty maneuverable situations. Reversing switch 61 simple reverses the direction in which motor 35 turns when foot switch 45 is depressed. The electrical interconnections allowing such reversal of polarity of a DC-powered motor is well

known. Accordingly, in the interest of simplicity and illustrating more significant mechanical detail the wiring is not shown in FIG. 5.

In operation, outboard motor 19 is started and the boat is powered into cruising speed. As the boat planes out for cruising speed, a portion of draft surface 15 clears the water as does well 25, leaving planing surface 17 in the water. Upon reaching the destination for fishing, outboard motor 19 is shut off.

Once again the boat has its draft surface 15 in the water. Secondary propulsion and guidance means 23 is lowered so that propeller assembly 31, including propeller 27, is in the water. Electric motor 35 is started by depressing switch 45. Fishing equipment is suitably employed; for example, casting lures into the water; while the foot-steering control is employed to steer the boat. If it is desired to stop trolling or to anchor in a sheltered spot, switch 45 is released.

Although the invention has been described with respect to employing a dry electric motor mounted within the hull, a waterproof electric motor integrally mounted with the propeller can be employed as a part of propeller assembly 31 instead of the electric motor in the hull connected via shaft-gear arrangement with the propeller. Moreover, if desired, a dry electric motor can be employed in the hull with a flexible shaft-gear combination such that vertical member 33 and propeller assembly 31 can be lowered into the water without changing the elevation of the torque-inducing means, or electric motor.

Well 25 can be as large as desired to accommodate the secondary propulsion and guidance means being employed. In the embodiment illustrated, well 25 is large enough that propeller assembly 31 can be retracted thereinto when the propeller is substantially aligned with vertical member 33. As can be seen by referring to dotted lines for propeller 27, in FIG. 4, being stopped in the position transverse to vertical member 33 presents no problems since the keel of the boat will deflect one blade of the propeller and effect alignment as bail 36 is pulled upwardly, retracting secondary propulsion and guidance means 23.

Well 25 is located in the portion of the hull surface that extends beyond the planing surface in the hull of the boat. In certain unusual hull structures; such as, catamarans or boats having planing surfaces analogous to skiis that raise the hull or portions of the hull out of the water during cruising speeds; well 25 may be located in almost any sector of the boat. In conventional craft having a single continuous planing surface, well 25 is located forward of the planing surface of the boat. For improved directional control, well 25 should be located as far forward as practical but still readily accessible. Well 25 is preferably located such that it will be in the water when the draft surface of the boat is in the water but out of the water when only the planing surface is in the water. It is vital that well 25 be located such that propeller 27 can be extended into the water at trolling speeds; that is, at the low speeds when the draft surface of the hull is in the water. Ordinarily, for a conventional boat 14 feet to 18 feet in length, well 25 is located in the forward 5 feet of the boat.

As indicated, in unusual hull configurations, well 25 may be located in almost any sector of the boat. For most efficient operation, however, the drag of the hull as it moves through the water should be nearly symmetrical with respect to well 25. For example, in ski or catamaran structures well 25 is located at or near the centerline of the hull and between the planing surfaces. In the more conventional craft having a single continuous planing surface, however, it is advantageous to locate well 25 slightly to one side of the keel line of the boat. By slightly to one side of the keel line is meant a distance to either the right or the left of the keel that will not induce too much eccentric drag. Eccentric drag is used herein to mean the opposition to flow of the hull through the water induced by locating the propeller assembly at other than the geometrical center of the hull's cross section. Ordinarily, the propeller assembly lowered into the water through well 25 is less than one-quarter the total width of the boat at that point to minimize eccentric drag. This also requires a relatively small angle of steer to correct for the tendency of the boat to steer in the opposite direction due to the moment arm between the keel line and propeller assembly 31 lowered through well 25. This prevents breaking the keel line, maintains the high structural strength of the hull, and reduces the turbulence effected by a high intake of water into well 25; yet does not induce an undue amount of eccentric drag.

Moreover, well 25 has its sidewalls extending above the water line and within hull 13. Thus, the secondary propulsion and guidance means may be removed; for example, for repair; without rendering the boat inoperative because of water leak through well 25. If desired a cap may be provided for the open well. Ordinarily, the secondary propulsion and guidance means will provide a seal with the top of the well that is resistant to water influx because of turbulence such as might be induced during accelerating to or decelerating from cruising speed.

Any materials normally employed in building and assembling the respective components of boats can be employed in the invention. The hull and well are readily and integrally formed in the stamped plastic hulls; such as, fibre glass. Any other materials with which waterproof construction results can be employed. Well 25 serves to increase the structural strength of the hull so rarely will there by any difficulty with retaining structural integrity in the vicinity of the well.

Thus, it can be seen that the invention provides a boat with a secondary propulsion and guidance means without the disadvantages of the prior art of having to store the trolling motor or have it in the water-inducing drag, without the interchanging of primary and secondary propulsion means, and effecting a high degree of maneuverability by having the secondary propulsion means pull, instead of push, the boat.

Although the invention has been described with a certain degree of particularity, it is understood that the present disclosure has been made only by way of example and that numerous changes in the details of construction and the combination and arrangement of parts may be resorted to without departing from the spirit and the scope of the invention as hereinafter claimed.

I claim:

1. A boat comprising:
   a. a hull adapted to operate with a draft surface in the water at low speeds and to operate with a planing surface less than said draft surface in the water at cruising speeds;
   b. a primary propulsion means;
   c. a primary guidance means; and
   d. the improvement comprising a well, and a retractable secondary propulsion and guidance means extendible downward through said hull and into the water at said low speeds via said well, said well being located outside of said planing surface whereby said secondary propulsion and guidance means can be retracted out of the water for said cruising speeds.

2. The boat of claim 1 wherein said hull has a single continuous planing surface and said well is located forward of said planing surface.

3. The boat of claim 2 wherein said well is located in said draft surface and forward of said planing surface.

4. The boat of claim 2 wherein said boat has a keel line and said well is disposed slightly to one side of said keel line.

5. The boat of claim 1 wherein said secondary propulsion and guidance means comprises:
   a. a retractable and steerable propeller assembly including a propeller for propulsion and a vertical member for steering;
   b. a torque inducing means connected with and adapted to rotate said propeller; and
   c. a steering system connected with said vertical member, adapted to effect directional control of said propeller assembly, and operable from within said hull.

6. The boat of claim 5 wherein said torque-inducing means is a waterproof electric motor directly connected with said propeller, both mounted on a shaft and extendible into the water at said low speeds and retractable out of the water at said cruising speeds.

7. The boat of claim 5 wherein said torque-inducing means is an electric motor mounted within said hull and connected with said propeller via a shaft-gear combination, said propeller being extendible into the water at said low speeds and retractable out of the water at said cruising speeds.

8. The boat of claim 5 wherein said steering system comprises:

a. foot control means movable laterally about at least one fulcrum point and operable with only one foot to effect steer of said propeller assembly when it is extended into the water; and

b. linkage means connected with said foot control means and with said vertical member, and operable to effect steer right and steer left of said propeller assembly in response to respective steer right and steer left movements of said foot control laterally about said fulcrum point.