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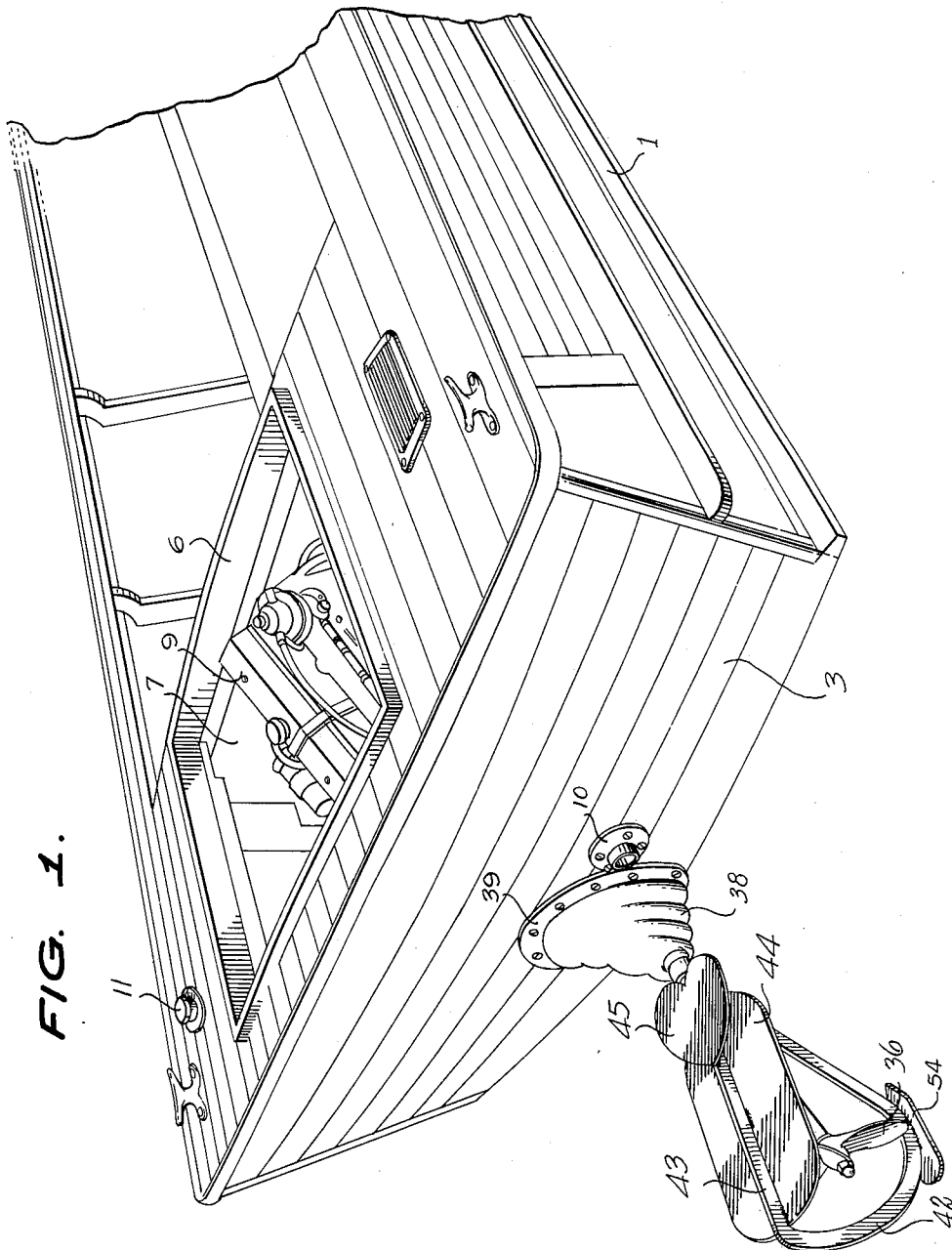
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3,057,320

BOAT TRANSOM PROPULSION UNIT

Filed Aug. 5, 1960

4 Sheets-Sheet 1



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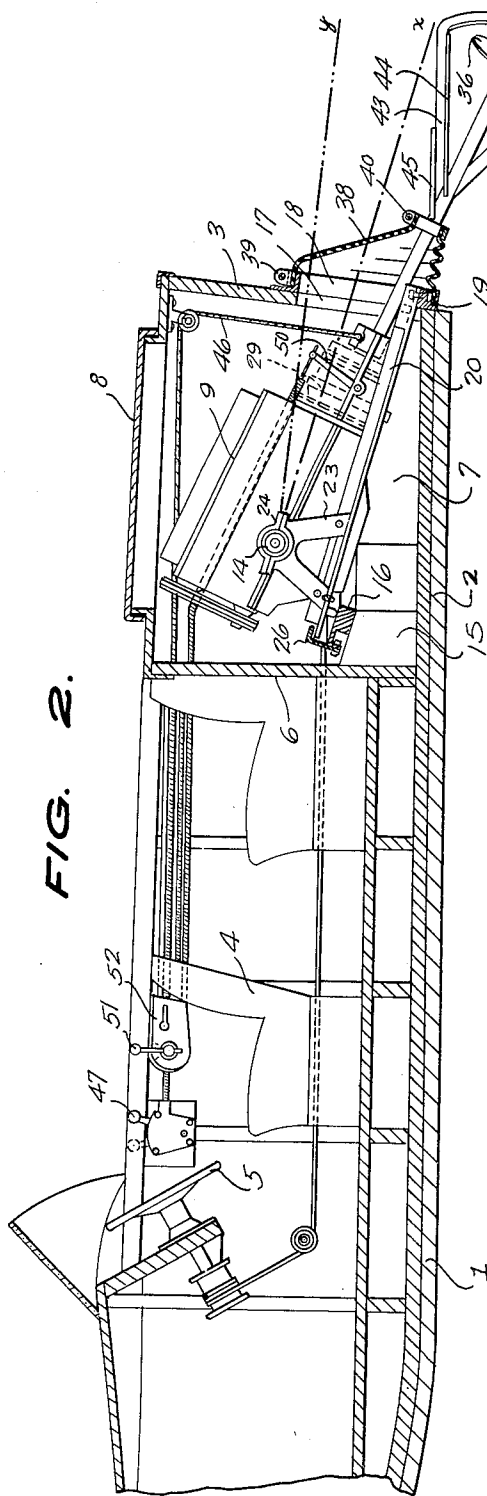
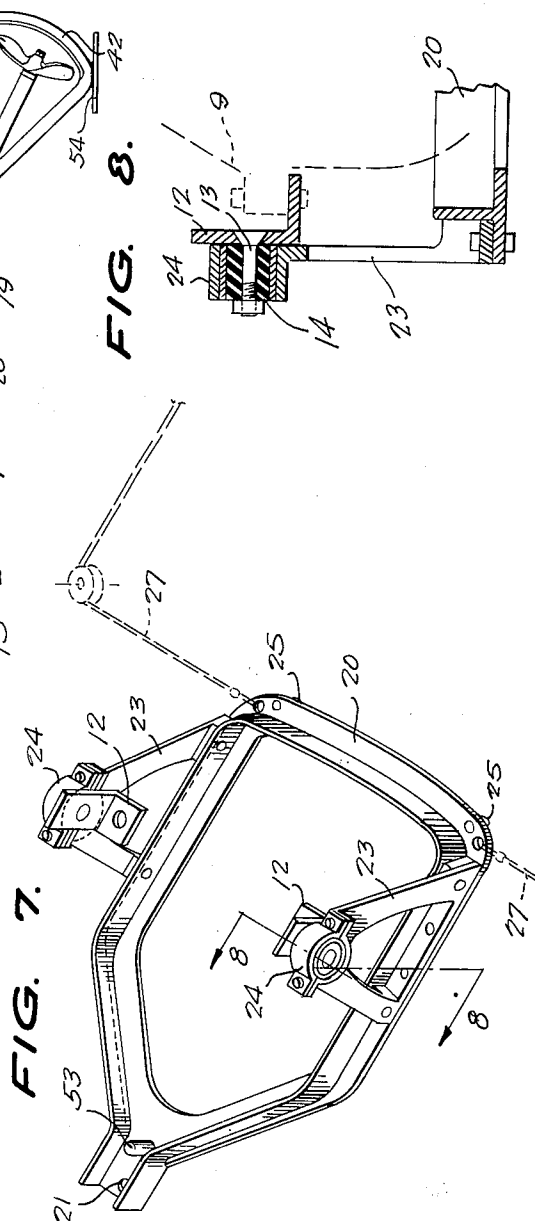
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BOAT TRANSOM PROPULSION UNIT

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FIG. 3.

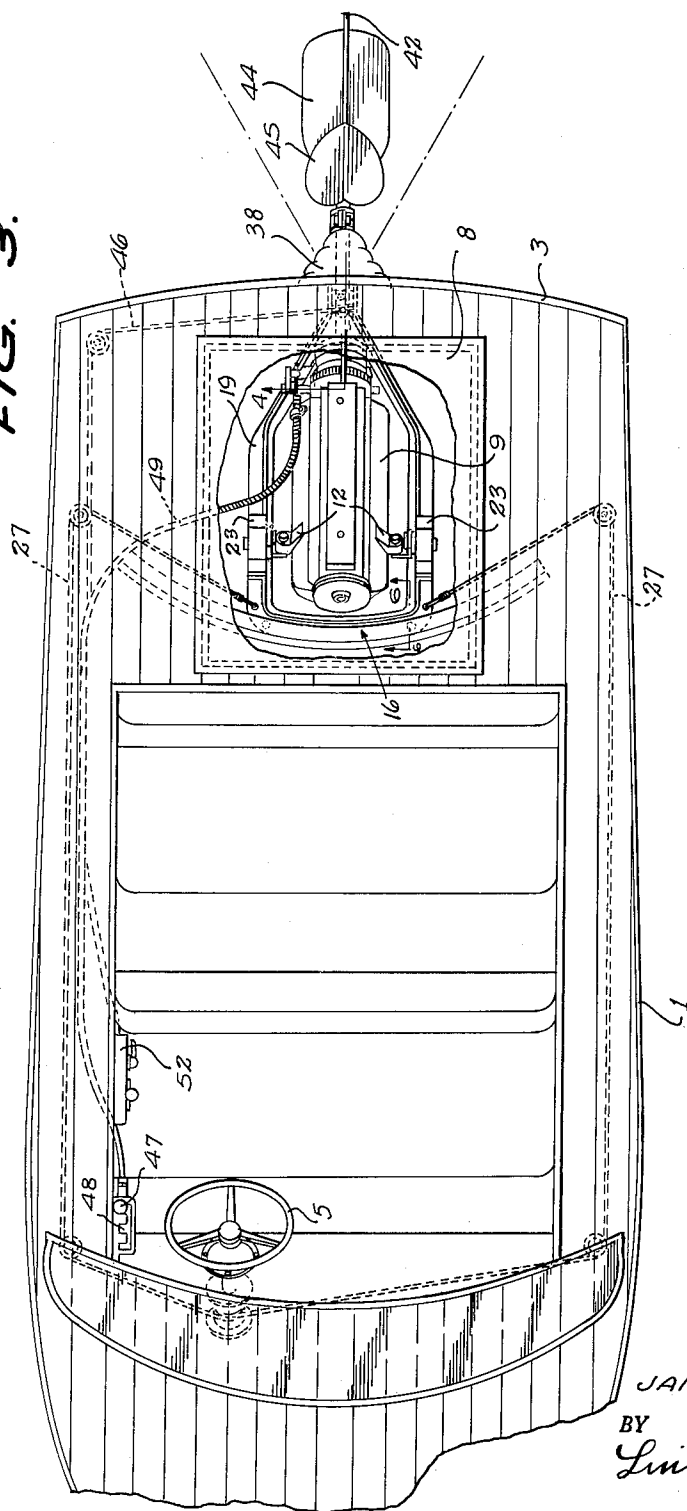
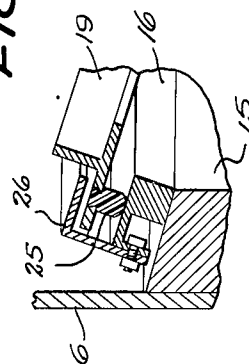


FIG. 6.



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FIG. 4.

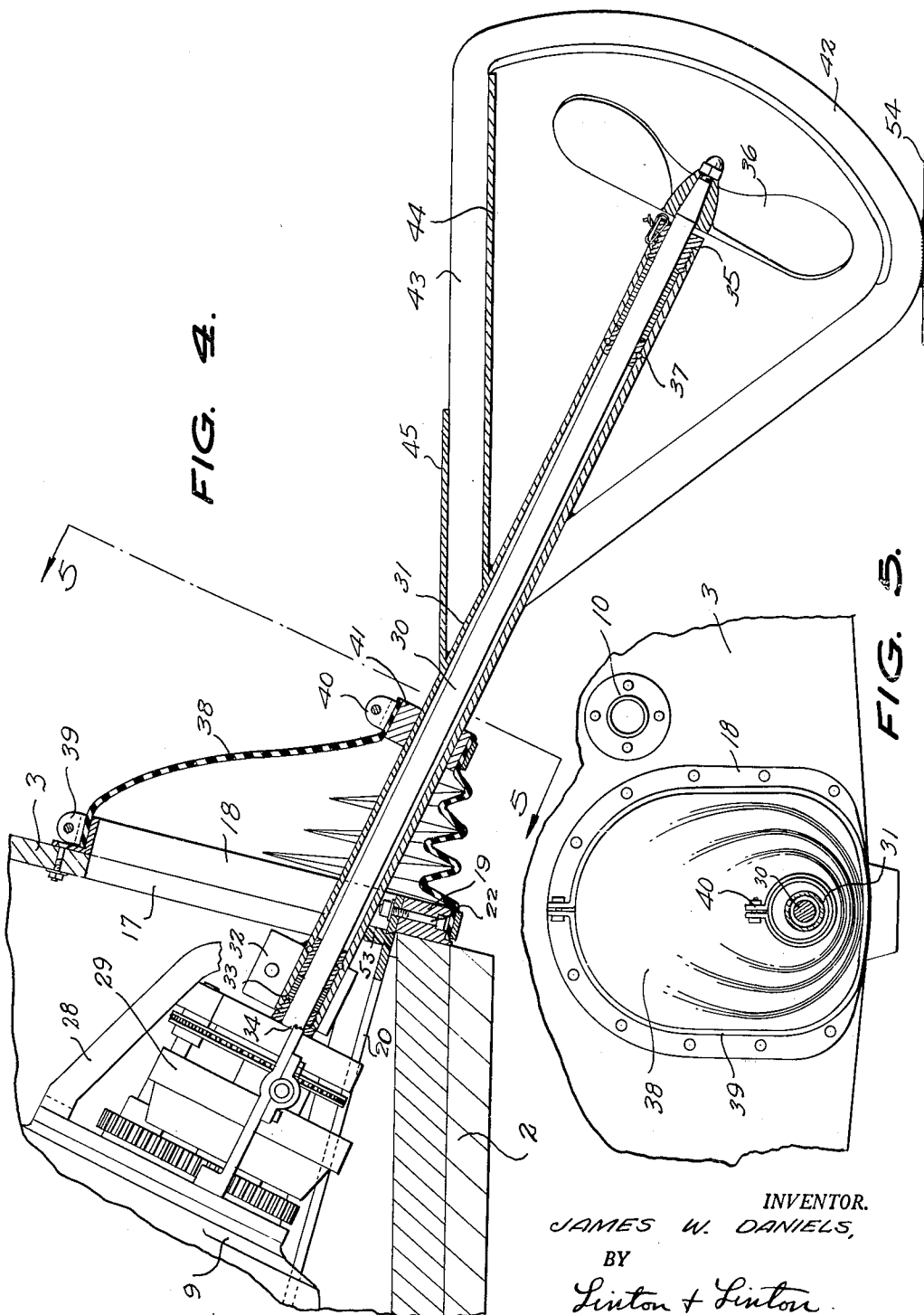


FIG. 5.

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BOAT TRANSOM PROPULSION UNIT

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6 Claims. (Cl. 115—35)

The present invention relates to a new and unique type of boat transom propulsion unit for inboard marine engines and an object of the invention is to combine the economy of an inboard motor with the flexibility of an outboard motor with additional advantages over both these conventional methods of boat propulsion.

Another object of the invention is to provide a mounting for inboard marine engines under the complete control from the driver's seat of the boat whereby the driven propeller can be used for steering the boat without the use of a rudder and its component supplementary parts and yet permit the propeller to be moved into several different horizontal planes, one of which being at a position entirely out of the water when not in use, another position for driving the boat in shallow water and finally a position for driving the boat in deep water without any bulky protrusions on or below the bottom of the boat that would tend to create a drag or retard speed with such flexibility as will permit the propeller to readily glide or coast over underwater obstacles or submerged objects, such as sand bars, oyster beds, etc., without damage to the propeller or its connection to the engine.

A still further object of the invention is to provide a direct drive unit between the engine shaft to the driven propeller without the use of gears, pulleys, universal joints, etc., whereby the maximum power of the engine may be utilized for driving the boat in a forward direction.

A still further object of the invention is to provide a boat transom drive unit between the engine and propeller whereby the thrust point will be focused at the keel of the boat for not only the maximum efficiency of the propeller's thrust but effecting immediate planing at the take-off of the boat without the usual stem raise of the boat which latter is overcome by weight being transferred to the forward end of the boat.

Other objects will be in part obvious and in part pointed out as the description continues.

In the drawings:

FIG. 1 is a perspective view of the stern end of a boat employing my transom drive for inboard motors and the cover of the motor compartment of the boat being removed.

FIG. 2 is a vertical longitudinal sectional view of the same.

FIG. 3 is a plan view.

FIG. 4 is an enlarged sectional view through the transom drive unit.

FIG. 5 is a detail rear view of the boat taken on the line 5—5 of FIG. 4 in the direction of the arrow points.

FIG. 6 is a detail sectional view.

FIG. 7 is a perspective view of the engine bed or carrier frame, and

FIG. 8 is a detail sectional view illustrating the pivoted connection between the engine and its bed or carrier frame.

In the accompanying drawings, the numeral 1 indicates it is entirely a conventional type of motor boat with the usual keel 2 extending along the bottom from stem to stern and the aft end being closed by the transom 3. The driver's seat 4 in the forward part of the boat is arranged adjacent to the panel board in which is supported the steering wheel 5. Extending transversely of the boat is a partition or bulk-head 6 forming a well or engine

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compartment 7 and the opened upper end of the latter is closed by means of a cover 8 so as to hide from view of the boat's occupants the engine as well as reducing the noise associated therewith when in operation. The engine 9 is only diagrammatically shown to illustrate a conventional four-cylinder water-cool marine-type engine, but may be of any size or design as power requirements may demand. This engine has a detachable exhaust pipe not shown leading to the exhaust opening 10 in the transom 3. Also mounted in the compartment 7 and not shown is a fuel tank having leading thereto a supply line closed by means of the cap 10. The fuel line leading to the carburetor of the engine 9 as well as its electrical connection as such as they can readily be detached where-by the entire engine 9 may be lifted from the compartment 7 when the cover 8 is removed for the purpose of making repair or for storage.

The angle plates 12 as best shown in FIG. 8 of the drawings are secured to the opposed side of the engine housing and secured to each plate 12 is a stub shaft or bolt 13 surrounded by a rubber bushing 14.

Mounted in the hull of the boat is a supporting block 15 for an arcuate track 16. The transom 3 of the boat is provided with an opening 17 and entirely surrounding the latter is a bracket 18 of substantially L-shaped in cross section with its lower end being slightly enlarged as at 19 with a center opening extending therethrough. The engine mount or frame 20 is provided in its aft end with an opening 21 registering with the openings in the lower section 19 of the bracket 18 and extending through these openings is a bolt 22 for pivotally connecting the engine frame 20 to the transom bracket 18. Secured to the opposed sides of the engine frame 20 are the engine supporting brackets 23 each having a detachable bearing block through which extend the rubber bushings 14. A pair of spaced nylon plugs 25 secured to the engine frame 20 ride upon the track 16 without any other lubrication. The detachable brackets 26 retain the outer or free end of the engine frame 20 upon the track 16. With the cables 27 connecting the engine frame with the steering wheel 5, the engine 9 and its supporting frame 20 may be caused to swivel or turn in opposite directions upon the pivot pin 22.

Secured to the engine housing is a bracket or carriage 28 which latter supports a dry-friction transmission 29 as better shown and described in my co-pending application filed on an even date herewith from transmitting motion in opposite directions directly from the crank shaft of the engine 9 to the propeller shaft 30. This propeller shaft 30 is supported in and encased in a rigid tube 31 forming the carrier for the transom drive. The inner end of this tube 31 is detachably connected in the split coupling 32 at the aft end of the transmission carriage or bracket 28. An oilite bearing 33 supports the inner end of the propeller shaft within the tube 31 and a seal 34 prevents oil and water from flowing beyond the bearing 33. A stuffing box gland 35 is connected to the outer end of the tube 31 or that end adjacent the propeller 36 and packing is retained in the tube 31 between the stuffing box gland 35 and the packing stop 37. By placing a little oil within the tube 31 and permitting water to pass the packing stop 37, the oil will be floated therein supplying all the lubricant needed for the bearing 33.

A flexible boot 38 preferably molded from a synthetic rubber composition such as neoprene has its larger end connected to the transom bracket 18 by means of the clamp 39 and its opposite end secured by means of a clamp 40 to a block 41 welded or otherwise secured to the tube 31. This boot is used for merely closing the opening 17 in the transom 3 so as to prevent water from entering the engine compartment. However, this boot 38 permits the tubular casing 31 and propeller shaft jour-

nalled therein to move freely in horizontal and vertical directions as may be required.

Welded to the tube 31 are the opposite ends of a propeller guard and stabilizer 42 having secured to its upper horizontal section 43 a cavitation plate 44 and a spray shield plate 45.

A cable 46 has one end connected to bracket 32 and its opposite end to a lever 47 mounted adjacent the driver's seat 4. This lever 47 is capable of engaging any one of the three notches in the rack bar 48 for retaining the motor and propeller in any one of its three before-mentioned positions.

A cable 49 has one end connected to the transmission lever 50 and engine controls to a lever 51 mounted in the control box 52 whereby when moving the lever 51 in a forward direction, the transmission will first connect the engine with the propeller shaft for driving the boat in a forward direction and then be moving the lever 51 in a still forward direction, the engine speed is increased. By reversing the direction of the lever 51, the transmission lever 50 will be moved in a reverse direction for connecting the transmission to the propeller shaft whereby the direction of rotation of the latter will be reversed and the boat propelled in a reversed direction.

The normal driving position of the propeller is that best shown in FIGS. 1, 2, and 4 of the drawing whereupon the tubular casing 31 freely rests upon the nylon stop 53 secured to the engine bed frame 20 thereby retaining the engine and propeller shaft at an angle of approximately 22 degrees with respect to the boat and as the tubular casing 31 is freely supported upon this nylon stop, the propeller can be vertically raised as the guard 42 passes over any obstructions in the water.

When the lever 47 is moved forward into the center notch of the ratchet plate 48, the engine and tubular casing 31 will be moved to and held in a plane substantially as that indicated by the line X in FIG. 2 of the drawing or the shallow water driving position of the propeller and yet the propeller is again free to be raised as the guard 42 passes over obstructions in the water or contacting sand bars and the like. At times, it is desirable to retain the propeller entirely out of the water or retained in a position suitable for transporting the boat from one location to another and to accomplish this latter, the lever 47 is moved forward to the last forward notch in the ratchet plate 48 whereupon the tubular casing 31 and propeller is moved to a plane substantially along the line Y as indicated in FIG. 2 of the drawing. The flexible boot 38, which merely closes the opening 17 in the transom, not only permits the vertical movement of the tubular casing 31, but also allows for any lateral movement of this tubular casing 31 as the propeller acts as a rudder for guiding the direction of travel of the boat.

Due to the three-point suspension of the engine bed frame 20, approximately 60% of the total weight is on the transom 3 at a point where it connects to the keel 2 of the boat and the balance on the bottom framing of the boat, providing an ideal weight distribution and excellent trailering facilities. The inboard engine being located in the stern of the boat with the thrust point of the transom drive being focused at the stern of the boat keel rather than on a hinge point at the center or top of the transom gives the best location for maximum efficiency of the propeller thrust and boat propulsion. Furthermore, this transom drive will automatically "kick-up" with any slight pressure upon the propeller guard while under power in a forward direction and when under power in reverse it will have a tendency to raise itself to provide propulsion instead of digging deeper into the water as in the case of conventional outboard motor propulsion.

A mud shoe 54 is welded or otherwise secured to bottom of the skeg or guard 42 in a plane horizontal with that of the plates 44 and 45 so as to prevent the

guard 42 from digging too deep within soft or muddy bottoms.

The pivot point of the pin 22 accomplishes the following dual purpose: (a) permits the engine carrier 20 to swivel horizontally in all degrees within the limitation of the track 16, and (b) permits the boat to be pulled through the water at a plane horizontal with the bottom of the boat, without the aid of any mechanical lifts whatsoever that require extra power. The accomplishment of this latter purpose can be best described by stating that the thrust of the revolving propeller 36 is transmitted through the shaft 30 directly to the engine and its mount brackets 23, thence to the engine carrier 20 which exerts a pull at the pivot point 22. This pull at the pivot point 22 causes the boat to be propelled in a horizontal plane level with that of the bottom of the boat. The direction of the propeller thrust is, therefore, on a line direct to the engine and then in a reverse direct line to focus the thrust to the keel of the boat of the point 22 for pulling the boat through the water instead of the propeller thrust being used to push the boat through the water.

The lateral suspension points of the engine on its mounting brackets 23 are most effective in the present installation at about four inches above the engine thrust line from the propeller shaft, although the foregoing suspension points may vary above or below four inches in other installations, according to the size of the engine employed. These suspension points must be at the proper locations and so engineered as to permit the engine and out-drive to tilt upward with as little effort as possible on impact with an object or with the bottom of the water; and to hold the cavitation plate 44 down sufficiently to prevent or minimize cavitation.

The propeller extends farther from the stern of the boat than usual for the purpose of not only preventing any bulk protrusions below the boat as would retard its speed, but to provide for a relatively long cavitation plate 44 and propeller spray plate 45 which together greatly assist in planing of the boat during fast take-off propulsion.

Due to the flexibility as a complete unit with the engine and easiness of control from the driver's seat of the combined features of steering the boat and adjusting and holding the drive unit at various elevations renders this transom drive unit for inboard motor boats highly desirable and, furthermore, by effecting a direct drive between the propeller shaft and engine crank shaft, renders a more economical, simplified and efficient boat propulsion exceeding conventional inboard and outboard installations.

I claim:

1. The combination with a motor boat having an open end well formed in the rear end thereof, a motor positioned in said well and having a driving shaft, a stern transom having an opening extending therethrough, a keel connected to said transom and a cover for closing the open end of the well formed in the boat, of a bracket connected to said transom and connected to said keel of the boat, an arcuate track mounted within the well of the boat, a bed frame, means for pivotally connecting one end of said bed frame to said bracket at a point adjacent to said keel of the boat, means for movably supporting the opposite end of said bed frame upon said arcuate track whereby said bed frame may oscillate horizontally in opposite directions, means for pivotally supporting the motor of the boat upon said bed frame whereby it may vertically oscillate therein, a tubular casing having one end connected to and supported by said motor of the boat a propeller shaft connected to the driven shaft of the motor of the boat and extending through said tubular casing, a propeller connected to said propeller shaft, said tubular casing extending through the opening of said boat transom, a flexible boot connected to said tubular casing closing the opening within said boat transom, manually operatable means for oscillating said bed frame whereby

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said propeller of said propeller shaft may steer the path of travel of the motor boat and other manually operatable means for oscillating the boat's motor upon said bed frame whereby said propeller shaft may be elevated to various horizontal positions with respect to the motor boat.

2. A transom drive for inboard motor boats comprising in combination a boat hull having a keel, a motor for operating said hull, a motor bed frame, means for pivotally connecting one end of said motor bed frame to said keel of said boat hull at a point adjacent the stern of said hull, an arcuate track mounted upon said bed frame of said boat hull, a pair of spaced nylon plugs secured to the opposite end of said motor bed frame and adapted to ride upon said arcuate track whereby said motor bed frame may oscillate horizontally upon its pivoted connection to keel of said boat, hull a pair of supporting brackets recessed to the opposite sides of said motor bed frame and each having a bearing block, stub shafts secured to said motor and pivotally mounted within the bearing blocks of said supporting brackets whereby said motor may be tilted vertically with respect to said motor bed frame, a tubular casing having one end supported by and connected to said motor, a propeller shaft journaled within said tubular casing, a propeller connected to said propeller shaft, a transmission connecting said propeller shaft to the driven shaft of said motor whereby said propeller shaft may rotate in opposite directions, a propeller guard connected to and supported by said tubular casing, a cavitation plate supported by said propeller guard, manually operable means for oscillating said bed frame whereby said propeller of said propeller shaft may steer the path of travel of the motor boat and other manually operable means for oscillating said motor upon said bed frame whereby said tubular casing, propeller shaft journaled therein, propeller guard, propeller, and cavitation plate may be elevated to various horizontal positions in respect to the motor boat.

3. A transom drive for inboard motor boats comprising in combination an inboard motor having a housing and a drive shaft, a tubular casing having one end connected to and supported by the housing of said inboard motor and its opposite end extending beyond the transom of the boat, a driven shaft journaled within said tubular casing, a propeller connected to said driven shaft so as to rotate therewith, means for connecting said driven shaft to said drive shaft of the inboard motor, means for manually oscillating said engine housing and thus said propeller for the steering of the boat, other manually operating means for vertically pivoting said engine housing and thus raising and lowering said propeller at various positions in respect to the boat and maintaining such elevated positions.

4. A transom drive for motor boats comprising in combination a boat hull having a stern transom and a keel, a supporting frame movably mounted within said boat hull and connected to said keel adjacent said transom, an

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engine pivotally supported upon said frame for being pivoted vertically thereon, a tubular casing secured to and supported by said engine and extending through said boat transom, a driven shaft journaled within said tubular casing and having one end thereof connected to the drive shaft of said engine, the opposite end of said driven shaft extending beyond the stern transom of said boat hull, a propeller connected to said extended end of the driven shaft, means for moving said supporting frame mounted within said boat hull and thereby said propeller for steering said boat hull and further means for moving the engine about its pivoted connection to said supporting frame within said boat hull for elevating said propeller with respect to said boat hull and maintaining said propeller in its elevated positions.

5. A boat transom drive comprising a boat hull having a stern transom and a longitudinal keel, said boat hull transom having an opening extending therethrough, a bracket secured to said transom exteriorly of said boat hull and extending entirely around the opening therein with its lower end positioned adjacent the keel of said boat, a bed frame having an end portion slidably mounted within said boat hull, a stub axle pivotally connected an opposite end portion of said bed frame to the lower end of said bracket adjacent said keel, an engine, means supporting said engine upon said bed frame, a tubular casing having one end connected to and supported by said engine and extending through the opening within said transom thereof, a propeller, a propeller shaft journaled within said tubular casing having one end connected to the drive shaft of said engine so as to rotate therewith and its opposite end extending beyond said tubular casing with said propeller attached thereto and flexible means connected to said tubular casing and said bracket for closing the opening within the transom of the boat.

6. A boat transom drive as claimed in claim 5 wherein said flexible means consists of a boat having an end portion abutting and connected to said bracket completely therearound forming a water tight seal therewith, said boat having an opening in the other end portion thereof with said tubular casing extending therethrough, means clamping said boat other end portion to and around said tubular casing forming a water tight seal therewith and said boat other end portion being accordion-pleated for permitting said tubular casing to be readily raised and lowered relative to said boat hull.

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