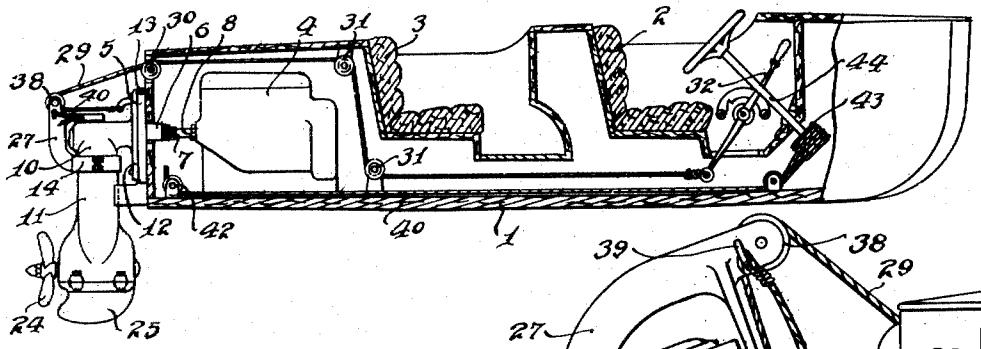
Feb. 16, 1932. D'ARCY J. JACQUES 1,845,712

OUTBOARD DRIVE MECHANISM

Filed March 27, 1931 3 Sheets-Sheet 1

Fig. 1.



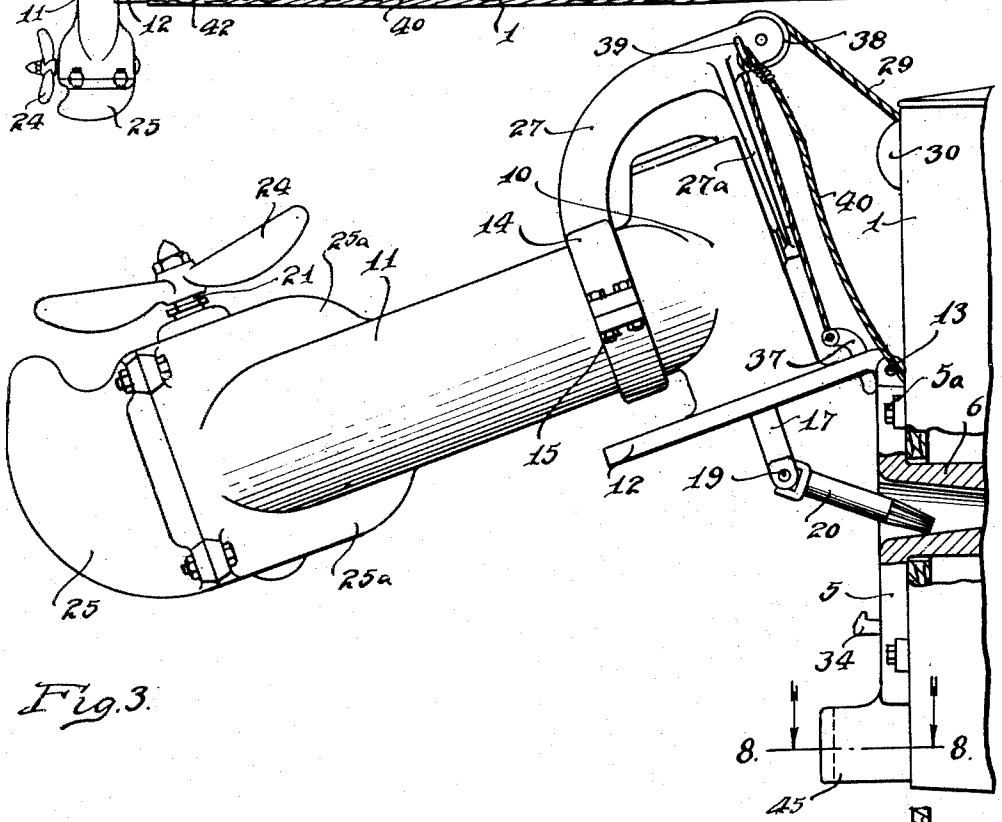
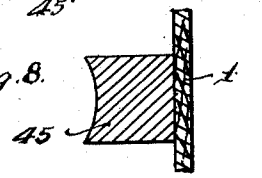


Fig. 3.

Fig. 8.



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OUTBOARD DRIVE MECHANISM

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Fig. 1.

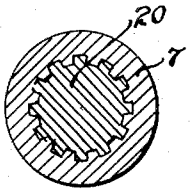


Fig. 2.

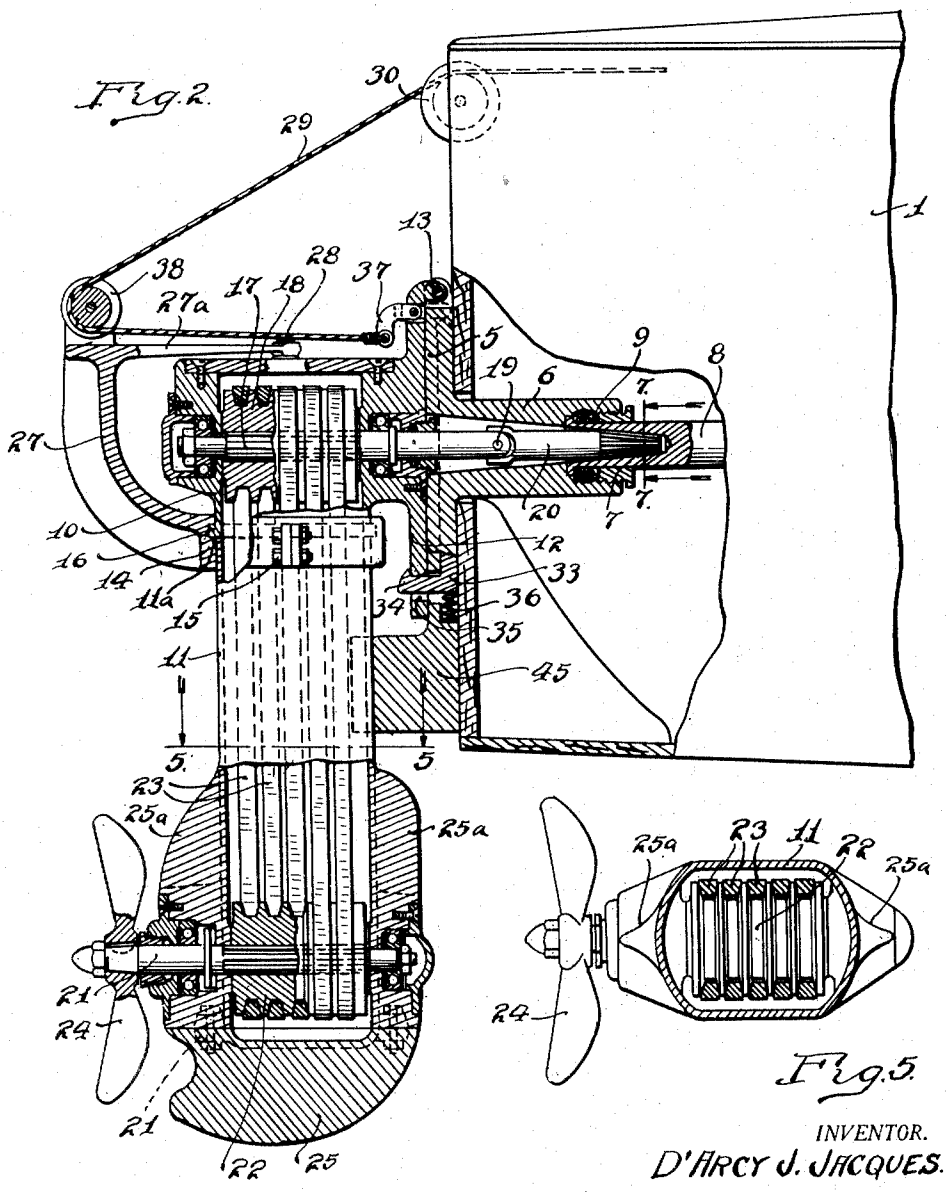


Fig. 5.

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OUTBOARD DRIVE MECHANISM

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Fig. 6.

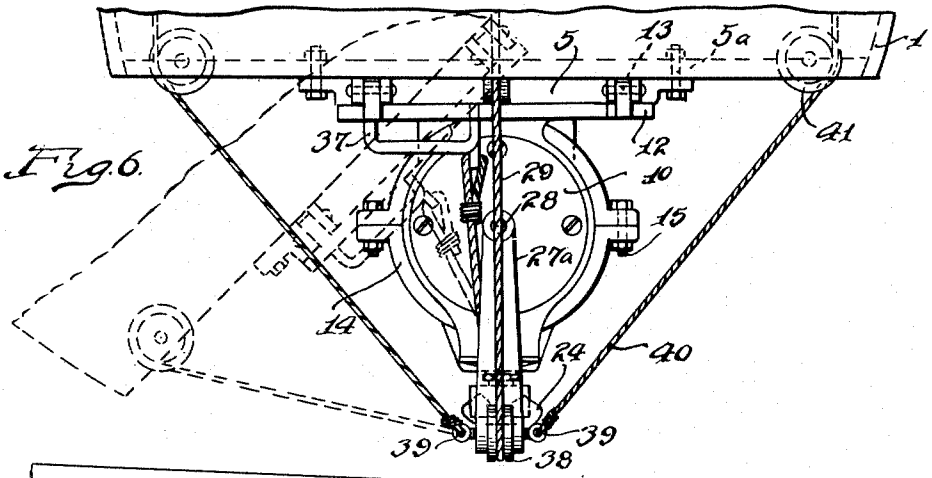
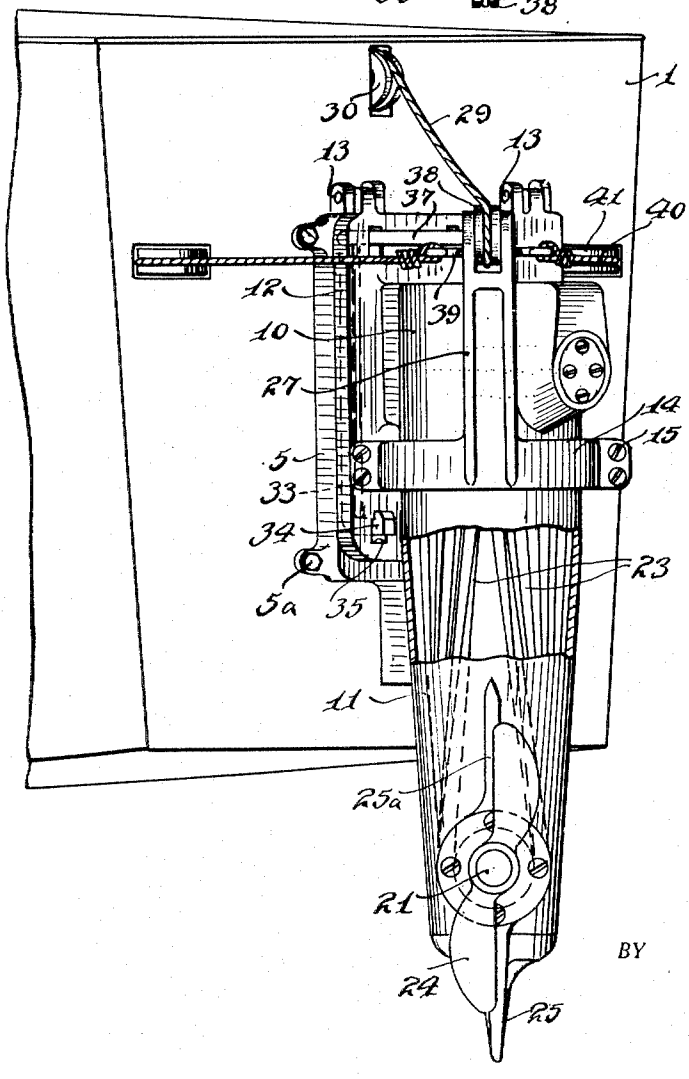


Fig. 4.



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UNITED STATES PATENT OFFICE

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OUTBOARD DRIVE MECHANISM

Application filed March 27, 1931. Serial No. 525,681.

This invention relates to outboard propeller drive mechanisms.

An object is to associate an inboard engine with an outboard drive unit, and to provide for a pivotal actuation of said unit from its position of use to a position substantially above the water surface.

Another object is to provide mechanism for pivotally raising and lowering a propeller drive unit from a relatively remote control point.

A further object is to give to the lower portion of an outboard drive unit an approximate rudder form, and to provide for a steering rotation of said portion about a substantially vertical axis.

Still another object is to equip a pivotal outboard drive unit with a lever arm and utilize the latter both to raise and lower the unit, and to effect a swivel steering control of the lower portion of the unit.

A still further object is to provide latch means for normally retaining said unit in its normal immersed position, and to provide for release of the latch by mechanism also serving to raise and lower the unit.

A still further object is to construct such a unit as a housing, receiving mechanism for driving the propeller shaft from a normally overlying shaft, said mechanism remaining operative in various positions established by a steering rotation of a lower portion of said housing upon an upper portion thereof.

These and various other objects the invention attains by the construction hereinafter described, and illustrated in the accompanying drawings, wherein:

Fig. 1 is a view in longitudinal vertical section of a boat equipped with the improved drive mechanism.

Fig. 2 is a view in side elevation of the stern portion of said boat and of the propeller drive unit carried by said portion, showing said unit in sectional elevation and in its position of use.

Fig. 3 is a similar view, showing the unit in side elevation and in a raised position.

Fig. 4 is a rear view of the boat and unit, showing the latter in position of use, the lower portion of the unit being turned to exercise a steering control.

Fig. 5 is a cross sectional view of the lower member of the unit, taken upon the line 5—5 of Fig. 2.

Fig. 6 is a top plan view of the unit and of the stern of the boat, indicating in dash lines a changed relation of the boat to the unit, established by a steering actuation of the unit.

Fig. 7 is a cross sectional view of a coupling connection taken upon the line 7—7 of Fig. 2.

Fig. 8 is a cross sectional detail of a thrust block taken on the line 8—8 of Fig. 3.

In these views, the reference character 1 designates a boat equipped with a driver's seat 2 and passenger seat 3 at the rear of the driver's seat, and having an engine 4 installed between the seat 3 and stern of the boat.

Rigidly exteriorly attached to the stern, by bolts 5*a* or the like, is a plate 5, preferably metallic, from which a sleeve 6 projects forwardly through a suitable opening in the boat stern, as best appears in Fig. 2. Within the forward end of said sleeve is embraced a female drive coupling member 7, fast on the engine shaft 8, and preferably a packing 9 establishes a water-tight joint between said coupling member and sleeve.

Supported on the plate 5 is an elongated housing comprising upper and lower members 10 and 11 respectively, meeting at 11*a*. The upper member at its front is integrally formed with a bracket 12, extended upwardly, downwardly and laterally to afford it a considerable surface for seating against the plate 5 in the normal position of said housing (see Fig. 2). One or more hinge pins 13 pivotally interconnect the upper ends of the plate 5 and bracket 12, supporting the housing on said plate and establishing an axis transverse to the boat, for swinging the housing between its normal position (Fig. 2) and raised position (Fig. 3).

The housing members 10 and 11 have coaxially aligned, substantially cylindrical meeting portions, embraced at their juncture by a two-part collar 14, the parts of which meet at opposite sides of said portions and

are clamped rigidly upon the member 11 by bolts 15 or the like. The lower end of the member 10 is formed with an exterior annular flange 16, freely engaging in an interior groove of the collar 14, whereby the latter swivelly mounts the lower housing member on the upper.

Journaled in the member 10 transversely to the longitudinal axis of the housing is a shaft 17, rigidly carrying a multiple sheave 18 within said member. Said shaft passes freely through the bracket 12 and in normal position of the housing, projects into the sleeve 6. Connected to the shaft 17 by a universal joint 19, is a male drive coupling member 20 which in normal position of said housing operatively engages the female coupling member 7. The members 7 and 20 are suitably adapted to establish a drive, as by forming them with complementary splines (see Fig. 7).

Journaled in the lower portion of the housing member 11 is a shaft 21, transverse to the swivel steering axis of the housing and normally parallel to the shaft 17. Upon said shaft, within the member 11, is mounted fast a multiple sheave 22, to which a drive connection is established from the upper sheave 18 by flexible endless belts or cords 23. The shaft 21 projects rearwardly of the housing member 11 to rigidly carry a propeller 24 of any desired construction.

The lower portion of the housing member 11 is somewhat enlarged as compared to the cylindrical upper portion of said member, and is formed with wedge-shaped forward and rearward projections 25*a*, best shown in Fig. 5. Also, said member 11 has a downwardly projecting fin 25, in the plane established jointly by the propeller shaft and swivel steering axis. Said wedge-shaped projections and fin adapt the member 11 to exercise a rudder function, when turned about its swivel steering axis.

It is now apparent that the housing 10, 11 together with the shafts 17 and 21, the propeller 24, and belts 23 forms a propeller drive unit, normally occupying a vertical position, submerging the propeller and adapted to be swung, when desired, entirely clear of the water. It is also evident that the lower member of this unit is swiveled to turn upon the upper member for steering purposes.

Rigidly and preferably integrally connected to the collar 14 is a lever arm 27, projecting rearwardly with upward curvature, its upper end lying preferably in the horizontal plane of the hinge pin (or pins) 13, when the unit is in use position. From the upper end of said arm, an auxiliary arm 27*a* projects forwardly above the housing member 10, its forward end engaging a stud 28 upstanding centrally on the member 10. A cable 29 engaging the upper end of the lever arm 26 extends over a pulley 30 journaled in the top portion of the stern of the boat, and is carried forwardly over suitable guide pulleys 31 to the lower end of a control lever 32 pivoted adjacent to the driver's seat for manipulation by the driver to swing the unit about its hinge pin (or pins) 13 between lowered and raised positions.

It is preferred to provide a latch mechanism for positively maintaining the normal position of the swinging unit, and it is further preferred to effect an automatic release of the latch when a pull is applied to the cable 29. Thus the front face of the plate 5 is vertically grooved to accommodate a sliding latch bar 33 formed upon its lower extremity with a rearwardly projecting hooked head 34, which in use position of the swinging unit engages in a vertically elongated slot 35 formed in the lower portion of the bracket 12. A coiled spring 36 recessed in the lower portion of the plate 5 exerts an up-thrust on the bar 33 whereby the latch head 34 hooks over the upper edge of the slot 35, when engaged in said slot. Bearing on the upper end of said latch bar is the forward extremity of an intermediately pivoted bell crank lever 37, to the rear end of which the cable 29 is terminally attached, said cable being carried around a sheave 38 surmounting the arm 26 and extending forwardly from said sheave to engage the lever 37. The arrangement is such that the latch bar 33, under thrust of the spring, normally holds the front end of the lever 37 raised, as in Fig. 2. A pull upon the cable 29 initially so rocks the lever 37 as to depress the latch bar, disengaging its hooked head from the bracket 12 and leaving the unit free to swing upward responsive to continued pull on the cable 29.

For exercising steering control of the described unit, there is oppositely attached to the upper end of the arm 27 a pair of eyelets 39, from which a pair of cables 40 extend, with considerable lateral divergence, (see Fig. 6) to the stern of the boat, passing therethrough upon suitable guide pulleys 41, and extending forwardly within the boat over additional guide pulleys 42, said cables finally engaging any suitable steering control mechanism, as for example, a sheave 43 fast on the lower end of an inclined steering shaft 44.

It is preferred to extend the plate 5 some distance downwardly beyond its portion seating the bracket 12, to mount a thrust block 45, having its rear face cylindrically curved to establish a seat engageable, in the normal position of the unit, by the cylindrical upper portion of the member 11. Thus said block transmits to the boat a major portion of the forward thrust of the propeller, being sufficiently below the hinge axis 13 to avoid exercise of high leverage by the unit, such as might subject the stern to an undue crushing stress.

By associating in the described construc-

tion an inboard motor with an outboard propeller drive unit, it is feasible to employ a much more powerful and efficient motor and propeller drive mechanism in a single outboard unit.

Adjustability of the described unit between a raised and lowered position permits the boat to safely enter quite shallow water, and also will at times prevent fouling of the propeller and unit with weeds. Such provision, furthermore, facilitates inspection and repair of the described unit.

An important feature of the disclosed mechanism is the automatic uncoupling of the unit from the engine, when the former is in raised position. Thus, as best appears in Fig. 3, elevation of the unit effects such a withdrawal of the coupling member 20 from the companion member 7, as to interrupt the drive connection. Resulting angularity between the shaft 17 and coupling member 20 is permitted by the universal joint 19. The rearward withdrawal of the coupling member 20, incident to upward swinging of the unit, is adequate to disengage the drive splines of the coupling members 7 and 20, while leaving the member 20 sufficiently inserted in the rearwardly flared opening of the sleeve 6 to be guided by the latter into renewed engagement with the member 7 when the unit is again lowered. The engaging ends of the coupling splines are preferably so tapered as to avoid endwise abutment of said splines.

By thus automatically uncoupling the engine as the unit is swung to raised position, there is avoided such damage to the unit as might otherwise result from operating the engine in said position of the unit.

It is to be understood that the engine will either be cut off, preliminary to raising the unit, or the drive connecton will be interrupted at some point between the engine crank shaft and coupling 7, 20 by any well known arrangement of clutch or gears.

While outboard drive units have to some extent been heretofore adapted for upward tilting from their immersed positions, it has devolved upon the driver or some other occupant of a boat to effect such tilting by leaning over the stern and gripping the unit. The herein disclosed tilting control is applied with a much greater convenience, ease, and safety, since it does not require the driver to leave his seat, and affords him a leverage minimizing his muscular effort.

When the lower member of the unit is rotated for steering purposes, the drive belts or cables 23 flex, as best appears in Fig. 4, to permit resulting angularity between the shafts 17 and 21. Thus, exercise of a steering control does not interfere with or interrupt the propeller drive. This, it may be noted, is hereby desirable, as the angularity of the propeller shaft to the direction of travel of the boat, resulting from exercise of a steering control, adapts the propeller, if driven, to strongly supplement the rudder elements 25 and 25*a* in effecting quick response of the boat to such control. The drive belts will possess sufficient elasticity to permit of such slight increase in their span as may be involved by the described swivel steering movement.

The described sectional construction of the housing 10, 11 facilitates proper tensioning of the drive belts 23, in addition to advantages hereinbefore mentioned. Thus, upon loosening the clamping bolts 15, the lower unit 11 may be shifted upwardly or downwardly within the collar 14, to establish a desired belt tension.

While it is apparent that the illustrated embodiment of my invention is well calculated to adequately fulfill the objects and advantages primarily stated, it is to be understood that the invention is susceptible to variation, modification or change within the spirit and scope of the subjoined claims.

What I claim is:

1. An outboard drive mechanism comprising a support having upper and lower members, the latter being rotative on the former for steering purposes and comprising a rudder portion, means engaging the upper member of said support for pivotally attaching the support to the stern of a boat to swing about an axis transverse to the boat, a driving shaft journaled in the upper member, a driven shaft journaled in the lower member and normally parallel to said driving shaft, a drive connection from the driving to the driven shaft, means for applying power to the driving shaft, a propeller upon the driven shaft, an arm rigidly projecting from the lower member, means engaging said arm for actuating said support about said transverse axis to a raised position, and means engaging said arm for rotating said lower member on the upper member for steering purposes.

2. In an outboard drive mechanism, the combination with a unit comprising a propeller, drive mechanism for said propeller, and a support for said propeller and mechanism, of means pivoting said unit to swing about a substantially horizontal axis, between a position of use and a relatively raised position, a latch member adapted to fasten the unit in its use position, and means for actuating said unit to its raised position, effective upon said latch member to release the unit therefrom preliminary to raising of said unit.

3. In an outboard drive mechanism, the combination with a unit comprising a propeller, drive mechanism for said propeller, and a support for said propeller and mechanism, of means pivoting said unit to swing about a substantially horizontal axis, between a position of use and a relatively raised position, a latch member adapted to fasten

the unit in its use position, an arm projecting from said support affording leverage for swinging the unit about said horizontal axis, and an elongated flexible control element, operatively connected to said latch element and also operatively engaging said arm for swinging the unit, and extending to a remote point of control.

4. In an outboard drive mechanism, the combination with a unit comprising a propeller, drive mechanism for said propeller and a support for said propeller and mechanism, of means pivoting said unit to swing about a substantially horizontal axis, between a position of use and a relatively raised position, an inboard motor, and a drive coupling between said motor and drive mechanism comprising a pair of complementary coupling members, one universally joined to said drive mechanism, and movable with said unit in its swinging travel and the other fixed as regards said travel.

5. An outboard drive mechanism, comprising a support having upper and lower members, the lower member comprising a rudder and being rotative on the upper member for steering purposes, a substantially horizontal driving shaft journaled on the upper member, a driven shaft journaled on the lower member, occupying a parallel relation to said driving shaft in one position of the specified rotation of the lower member, an endless flexible member establishing a drive from said driving to said driven shaft, torsionally flexible to maintain a drive in selective positions of steering rotation of the lower member, and means for effecting steering rotation of the lower member.

6. In an outboard drive unit, a housing comprising upper and lower members, a propeller shaft journaled in the lower member, a drive shaft journaled in the upper member, a driving and a driven element upon said shafts, a flexible driving band mounted on said elements, and a connection between the parts of said housing affording selective relative adjustment of said parts to and from each other for regulating the tension of said band.

7. In an outboard drive unit, a housing comprising upper and lower members, a propeller shaft journaled in the lower member, a drive shaft journaled in the upper member, a driving and a driven element upon said shafts, a flexible driving band mounted on said elements, and means swiveling the lower of said housing members on the upper one for steering purposes, affording said members a selective relative adjustment to and from each other to regulate tension of said band.

8. In a propeller drive mechanism, an inboard motor comprising a shaft, a coupling member upon said shaft, an outboard drive unit comprising a propeller, drive mechanism for said propeller, and a support for said propeller and drive mechanism, means pivoting said unit for swinging travel from a propeller-immersing position to a raised position, a coupling member universally joined to said drive mechanism, and means for guiding the last mentioned coupling member into engagement with the first mentioned coupling member, said means maintaining engagement with the first mentioned coupling member in all positions of said swinging travel of the unit.

9. An outboard drive mechanism, as set forth in claim 1, said arm projecting upwardly to the approximate level of said axis transverse to the boat.

In testimony whereof I sign this specification.

D'ARCY J. JACQUES.