Feb. 23, 1965 J. W. EWING 3,170,434

AUXILIARY POWER UNIT FOR INBOARD CRUISERS

Filed April 15, 1963 2 Sheets-Sheet 1

Fig. 1

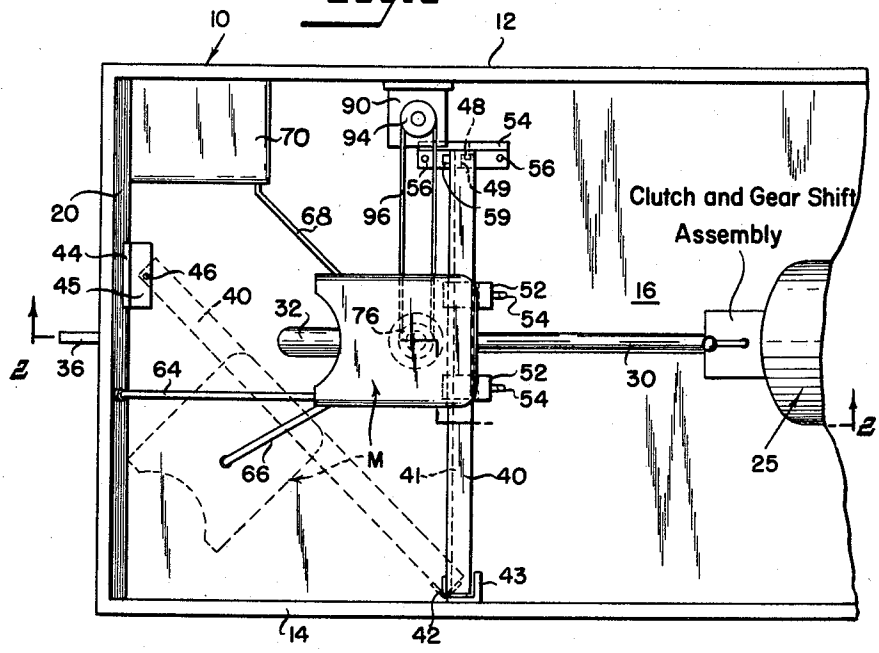
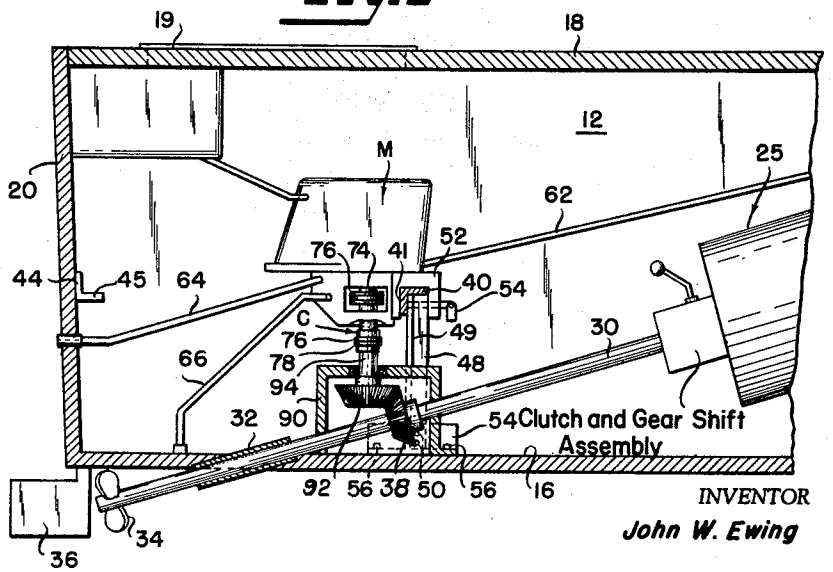


Fig. 2



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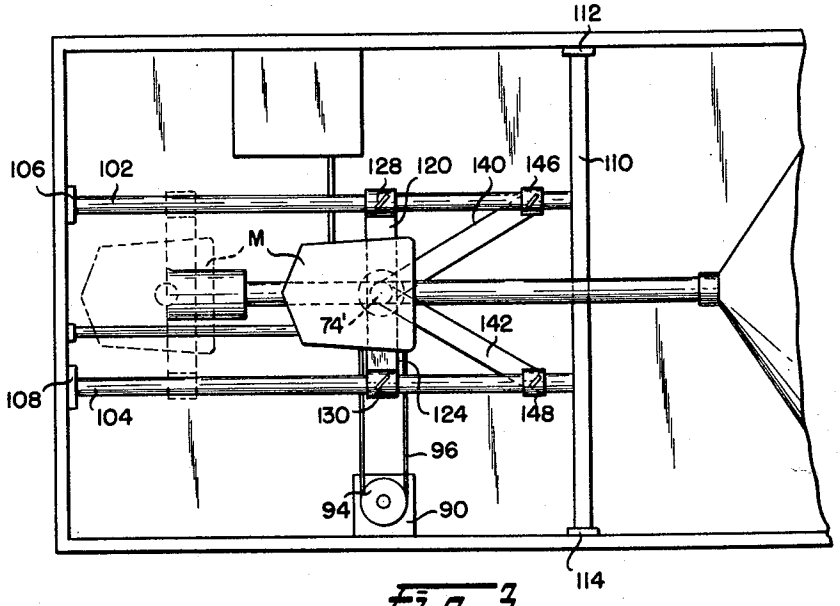


Fig. 3

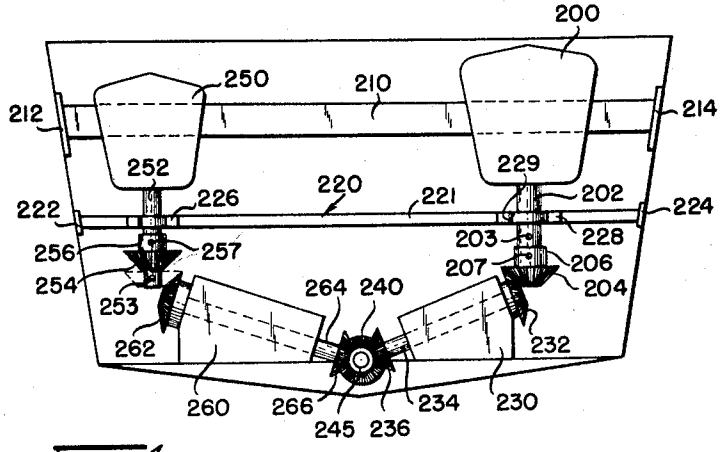


Fig. 4

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AUXILIARY POWER UNIT FOR INBOARD CRUISERS

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7 Claims. (Cl. 115—.5)

This invention relates to powered cruisers and particularly to those of the single engine inboard cruiser type.

The risk of being stranded by engine failure in a single engine cruiser has been a persistent one for many years, especially where the boating enthusiast takes extended trips which take him away from the areas where ready assistance is available in case of engine breakdown.

Heretofore, to provide a margin of safety it was necessary to purchase a twin engine cruiser to avoid the risk of being stranded by engine failure in a remote location far from assistance. Such cruisers are considerably more expensive than the single engine type.

Small cruisers have also in the past been handicapped by a lack of a small inexpensive electrical generator for general use when the boat is moored away from the dock.

Accordingly, it is a principal object of my invention to provide the safety of a twin engine cruiser inexpensively by providing a small auxiliary motor unit carried for ready use in the event of engine failure in a single engine inboard cruiser.

Also it is an object of my invention to provide in conjunction with the auxiliary motor, an inexpensive generator unit for such cruisers.

It is a further object of my invention to mechanically couple a modified outboard motor-type unit to the propeller shaft of an inboard single engine cruiser to thereby provide a simple and inexpensive power source.

It is also an object of my invention to use the mechanical power from a portable motor unit to directly provide auxiliary power to turn the propeller shaft of a single engine inboard cruiser in the event of engine failure.

It is also an object of my invention to provide a mounting arrangement for the auxiliary motor which will permit the ready connecting and disconnecting of the auxiliary motor to the propeller shaft as designed.

A further object of my invention is to provide a simple structural support arrangement for the auxiliary motor within the hull of the cruiser so that it can be immediately moved into position and coupled to the propeller shaft without difficulty.

Another object of my invention is to provide a gearing connection between the power shaft of the auxiliary motor and the propeller shaft of the cruiser.

A further object of my invention is to provide a simple inboard mechanical power arrangement for a propeller shaft using an outboard type motor as a power source instead of the conventional expensive inboard engine.

Other objects and advantages of my invention reside in the details of construction, arrangement, combination of the various parts of my apparatus as hereinafter fully set forth, and as specifically pointed out in my claims, and illustrated in the accompanying drawings, in which:

FIGURE 1 shows a stop view of the rear of a cabin cruiser with the deck removed to show the arrangement of my invention.

FIGURE 2 shows a cut-away side elevational view of the rear of the cruiser hull along the lines 2—2 of FIGURE 1.

FIGURE 3 is a view similar to FIGURE 1 in which an alternative mounting arrangement for an auxiliary motor is shown.

FIGURE 4 shows a transverse sectional view of an inboard cruiser hull illustrating the use of two outboard motor type power units, one for use as the main power source, and the other used for an auxiliary emergency engine.

Referring more particularly to the drawings, FIGURE 1 shows the boat hull generally indicated at 10 with sides 12 and 14, bottom 16, top deck 18 with a hatch 19, and the rear thereof at 20.

The inboard engine generally indicated at 25 is connected to the propeller shaft 30 through the clutch and gear shift assembly and extends through the bottom of the hull through the supporting sleeve bearing 32 and has a propeller 34 mounted on its end. The rudder of the cruiser is shown at 36 immediately behind the propeller.

Referring particularly to FIGURES 1 and 2 which show a pivotally supported motor generally indicated at M mounted on a cross support 40 which is hingeably connected to side 14 by a hinge 42 which is integral with depending flange 41 of angle iron 40, the hinge 42 being supported by an angle iron 43 integral with side 14 of the hull.

The motor M is shown in operating position in full line and in a stored position in dotted outline. When the motor is in stored position, angle iron 44 which is attached to the rear 20 of the hull supports the free end of the pivotable cross support iron 40 by means of its horizontal flange 45 upon which the end is rested and held in place by a pin connection 46 through both members.

In operable position, the horizontal motor support iron 40 rests upon the top of vertical angle iron 48 which in turn is supported by a bolt connection 50 to the horizontal angle bracket 54 supported to the bottom 16 of the hull by bolts 56. The flange 49 extends transverse to the hull and engages the under surface of the vertically disposed flange member of horizontal motor support 40, and both members are held together by a bolt connection 59.

It can readily be seen from an examination of FIGURES 1 and 2 that the motor can be pivotally moved from the inactive to the connected position with little difficulty and the bracket arrangements described above will provide adequate support for the motor.

The motor M is held in position on the angle iron crossbar by motor clamp members 52 and 54. The shaft 74 of motor M is modified so that a mechanical connection can be made with the propeller shaft 30.

Referring to the connection of the motor shaft 74 to the propeller shaft 30 as shown in the FIGURE 2, it will be noted that a shaft coupling C has identical flanged unit and is mounted between the end of shaft 74 and gear shaft 94 of gear box 90. A unit 76 is mounted on the end of shaft 74 and a matching flanged unit 78 is mounted on the end of gear shaft 94. The flanges of members 76 and 78 are simply fastened or bolted together in order to connect shafts 74 and 94 and provide a direct mechanical connection between the motor and to the gear box 90.

As shown in FIGURE 2, the gear box encloses the shaft 30 together with the gear 38 as well as pinion gear 92 and shaft 94. The gear 38 is fitted on the propeller shaft 30 and may be welded in position or held thereon by a conventional keyway connection.

It is understood that an arrangement other than a coupling and gear box assembly might be provided to couple the motor shaft 74 to the propeller shaft 30. For example, sufficient support for an extended shaft 74' which has a spur gear mounted at its end and in connection with the gear on the propeller shaft might also be provided together with a rigid support means to hold the shaft 74' rigidly and in mesh with propeller shaft gear when the motor M' is being used.

It is also possible with the gear box arrangement described above to mount the motor M in a permanent fixed position above the gear box, and merely disconnect the shaft mounted coupling units when the motor is not being used.

Electrical power generator **90** is shown attached to side **12** and has a power pulley **94** which is connected by means of a belt **96** directly to the pulley **76** on shaft **74** of the motor M. This arrangement provides a simple and inexpensive means of generating electrical power for cruisers when they are moved away from a dock and a source of inexpensive electrical power is not available. In operable position, the motor water intake is supplied through lines **66** and the exhaust from the engine fed through line **64** out through the rear **20** of the hull. Flexible throttle cable **62** is connected to the helm and permits the boat operator to control the motor M from the normal running position in the cabin of the cruiser.

An alternative mounting arrangement for the motor is shown in FIGURE 3 wherein the motor is slid forward from a rear to a forward operating position.

The motor is mounted on two parallel support rods **102** and **104** by means of support brackets **120** and **124**. These brackets are slidingly mounted on the parallel rods through hollow engaging sleeve members **122** and **126** which are integral respectively with support brackets **120** and **124**. The motor is locked in the desired position by means of wingbolts **128** and **130**.

The parallel rods **102** and **104** are supported to the stern **20** by bracket support members **106** and **108**, and at their other end are supported by a cross support member **110** which in turn is supported by brackets **112** and **114** which are fastened to the sides of the hull.

This parallel support rail allows the use of a simple, sturdy mounting assembly for a power shaft which may be effectively used in place of the gear box arrangement as generally described in the modification of FIGURES 1 and 2. The V support **140** and **142** shown mounted on the rails and in front of motor M provides a simple direct means for supporting the vertically disposed power shaft of the motor rigidly. This arrangement permits the spur gear and the bevel gear on the propeller shaft to be directly connected merely by sliding the motor forward into desired position and similarly sliding the V support to allow the spur gear which is directly connected at the end of the modified shaft **74'** of the motor to move into and directly mesh with the bevel gear **38** on the propeller shaft. Members **140** and **142** of the V support are respectively secured to the rails **102** and **104** through slidable collar sleeves **146** and **148**. The members **140** and **142** extend downwardly to a point above the spur gear where they meet to form a circular collar (not shown) arrangement which engages power shaft **74'** of the motor M to rigidly hold it in desired position so that the spur gear mounted directly on the end of the shaft will be held in engagement with the bevel gear **38** (not shown) on the propeller shaft **30**. The slidable collar sleeves **146** and **148** may be held in desired position by wingbolts as employed for collar sleeves **128** and **130**.

The auxiliary drive is operated by merely putting the engine in neutral, mechanically connecting the drive shaft of the auxiliary motor unit to the propeller shaft **30**, and then starting the motor M.

An arrangement for converting a boat hull to an inboard engine cruiser and also for providing an auxiliary emergency power source is shown in FIGURE 4 wherein a large outboard-type or portable motor is shown at **200** and is connected through a gearing arrangement to a central short propeller shaft **245**.

An auxiliary portable motor unit **250** is mounted opposite the larger motor **200** and is connected in similar fashion to the central propeller shaft **245**.

Both units are shown supported on a mounting bar **210** which is supported at either end by brackets **212** and **214**. Mounting bar **210** may be an angle iron of similar construction as cross support member **40** of FIGURES 1 and 2 and the motors may be clamped thereto in a fashion similar to that shown in FIGURE 2 for the mounting of motor M.

Main power unit **200** has a vertically disposed power shaft **202** which is modified to carry a spur gear **204** at the end thereof. The shaft is rigidly held in vertical position by means of a shaft support member **220** which is supported at either end by brackets **222** and **224** which are fastened to the sides of the hull. The cross support **220** may employ several different fastening arrangements. The illustrated mounting uses an angle iron for the cross member **220** having a vertical flange **221** to which a bracket **228** containing a ball bearing **229** is fastened.

Adjacent the end of motor shaft **202**, two vertically spaced and aligned holes are bored through the shaft to provide a means of holding the spur gear **204** in either the lowered or raised position to respectfully engage or to be held free of the intermediate gear **232**. Spur gear **204** is mounted on a sleeve member **206** which has two diametrically opposed openings therethrough of the same diameter as openings **203**. A holding pin **207** is inserted through the openings in the sleeve **206** and through one or the other opening **203** in vertical shaft **202** to hold the spur gear **204** in desired position.

A pillow block **230** supports a shaft and gear assembly connecting the gear **204** to the gear **240** of the propeller shaft **245**. The intermediate connecting shaft **234** has gears **232** and gears **236** which respectfully mesh with gears **204** and **240**.

The auxiliary motor **250** is mounted in a fashion similar to that for motor **200** and is shown with its shaft **252** extending downwardly through the strap bearing assembly **226** and supporting driving gear **254** in a raised position. This gear is mounted on a sleeve **256** of similar construction as sleeve **206** as above described, wherein a connecting pin **257** passes through the sleeve and the higher of the vertically disposed openings **253** in shaft **252** to hold it in an upright disconnected position.

When it is desired to use the auxiliary motor **250** the spur gear **204** is raised to the upper position by passing the pin **207** through the upper hole **203** and shaft **202** to thereby disengage power shaft, and the gear **254** on shaft **252** of the auxiliary motor is lowered to engage gear **262**, and held in position by the pin connection through the lower hole **253** of shaft **252**.

Pillow block **260** supports connecting gear shaft **264** to which the gear **262** and the driving gear **266** is connected, so that a direct drive from motor **250** to the gear **266** which meshes with gear **240** is provided to turn propeller shaft **245**.

In this particular modification in which a tandem arrangement of two outboard-type motors is used, it is also possible to use the gear box to which both units could be coupled instead of the dual connecting shaft arrangement as described above. The appropriate gear ratios are adjusted to the shaft speeds of the motor, and if necessary intermediate and alternative gearing arrangements may be used depending upon this factor and factors such as load, etc.

An alternative arrangement for the mechanism of FIGURE 4 may include the mounting of the propeller shaft and gearing outside of the hull in a water tight casing with the shafts of the main and auxiliary units extending through the hull and into the casing to engage the gearing mechanism.

With regard to the modifications of my invention set forth above, it is not necessary that the auxiliary motor be mounted below deck. Small cruisers may have insufficient clearance between the deck and bottom of the hull to receive an auxiliary outboard type motor. In this instance a mounting assembly may be provided to support the motor above deck, provision being made for the motor shaft to extend through the deck to mechanically connect with the propeller shaft. The engine may be disconnected from the mounting assembly in this instance and stored in another part of the boat until needed.

The arrangements disclosed above are highly advantageous due to their simplicity, permitting ready instal-

lation in existing cruiser construction for a relatively inexpensive sum.

The auxiliary motor also provides a means to substantially reduce the gasoline consumption for the cruiser when proceeding at trolling speed for an extended length of time.

While the invention has been described, it will be understood that it is capable of further modifications and this application is intended to cover any variations, uses, or adaptations of the invention following in general, the principle of the invention and including such departures from the present disclosure as come within known or customary practice within the art to which this invention pertains, and as may be applied to the essential features hereinbefore set forth and as fall within the scope of the invention or the limits of the appended claims.

Having thus described my invention, I claim the following:

1. A boat with an auxiliary power unit comprising a boat hull having an inboard engine with a propeller shaft connected thereto, and a portable, light weight self powered outboard-type auxiliary motor, support means within said hull on which said auxiliary motor is mounted so that it can be moved from a stored inactive position along a predetermined path to an active position, and having a vertical stub shaft aligned with the propeller shaft, power transmission means for mechanically connecting the propeller and motor power shaft, the propeller shaft being disengageable from the inboard engine to allow free rotation thereof, whereby the auxiliary motor can be connected mechanically to the propeller shaft to drive it freely of the inboard engine.

2. A boat with an auxiliary power unit comprising a boat having an inboard engine with the propeller shaft connected thereto, a portable, light weight self powered outboard type auxiliary motor mounted in said hull on a pivoting support structure so that the said outboard motor may be moved along a predetermined path from a stored out of the way position to an active position, the said outboard motor when in active position having a power shaft in alignment with the propeller shaft, a driving gear member mounted on the power shaft, and a gear mounted on the propeller shaft, said gears being aligned and in mesh and said power shaft being vertically disposed when said motor is in active position, the propeller shaft being disengageable from the inboard engine so that the auxiliary motor when in active position can mechanically drive the propeller shaft.

3. A boat with an auxiliary power unit comprising a boat hull having an inboard engine with a propeller shaft connected thereto, a motor support means within said hull and integral therewith having a portable auxiliary motor mounted thereon, said support means including means for permitting the motor to be moved along a predetermined path from an inactive stored out of the way

position to an active position, the motor when in active position having a drive shaft in alignment with said propeller shaft, said propeller shaft having gear means connected thereto, coupling means for connecting the power shaft of the motor to the gear means when the motor is in active position, the propeller shaft being disengageable from the inboard engine for independent operation when the auxiliary motor is used to drive the propeller shaft.

4. A boat with an auxiliary power unit as set forth in claim 3 wherein the support means has two parallel support rails along which the motor may be moved from the inactive stored position to the active position, the motor having two bracket members integral therewith which are slideably connected to said rails.

5. A boat with an auxiliary power unit comprising a boat hull having an inboard engine with a propeller shaft connected thereto, said propeller shaft extending angularly downward and through said hull at a point adjacent the stern and having a propeller at the end thereof, a light weight, portable outboard-type auxiliary motor, support means within said hull on which said auxiliary motor is mounted so that it can be moved from a stored inactive position along a predetermined path to an active position, said auxiliary motor having a vertically disposed power shaft which has a driver gear thereon, said propeller shaft having a gear integral therewith on a section within the hull and adapted to be engaged by the driver gear of the power shaft, means for disconnecting the propeller shaft from the inboard engine, and power shaft holding means to keep the driver gear on the power shaft in position so that it meshes with the gear on the propeller shaft, permitting the auxiliary motor to drive the propeller shaft when the inboard engine is not used.

6. A boat with an auxiliary power unit as set forth in claim 5 wherein a small electrical generator is disposed adjacent the modified power shaft and power transmission means connects both the electrical generator and the power shaft of the auxiliary motor.

7. A boat with an auxiliary power unit as set forth in claim 5 wherein said motor is mounted on two parallel rails and the power shaft holding means comprises a collar support structure which fits around the power shaft near the driver gear and is connected with said rails.

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