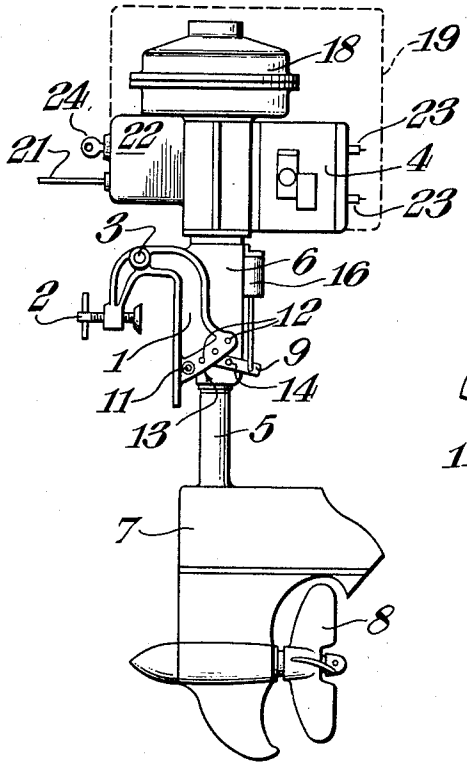
Sept. 22, 1959 C. H. HARRISON 2,905,130

OUTBOARD MOTOR TILT LOCK

Filed Dec. 22, 1958

Fig. 1.



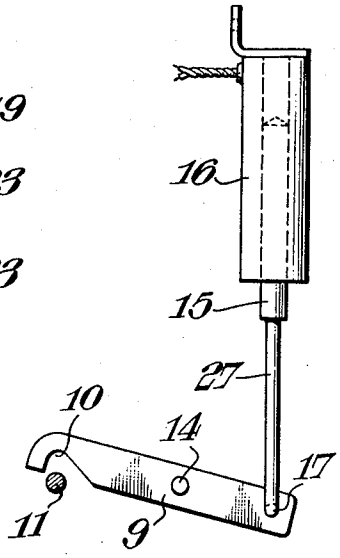
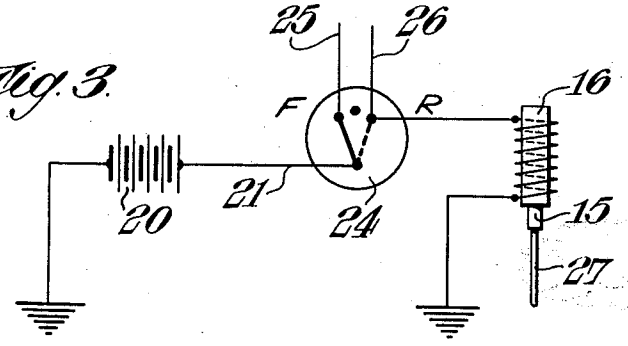


Fig. 2.

Fig. 3.



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OUTBOARD MOTOR TILT LOCK

Charles Henry Harrison, Hampton Hill, England

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3 Claims. (Cl. 115—17)

This invention relates to outboard motors forming propulsive units for attachment to a boat and of the type comprising an internal combustion engine carried by a suitable mounting structure for securing the unit to the boat's transom, and a downwardly extending driving shaft from the engine supplying power to a propeller carried by a propeller-casing disposed at the lower end of a propeller-casing support which is hinged to the mounting structure to provide for automatic tilting to prevent damage if an underwater obstruction is encountered. A lock is provided to prevent tilting, when the engine is in reverse, due to the backward pull of the propeller. In present constructions of outboard motor such a reverse lock usually is directly manually operated or takes the form of a bolt interconnected by linkage with the change gear lever so as to be shot home into the locking position when the gear lever is manipulated into reverse.

The invention relates further to propulsive units of the foregoing type provided with electric starter devices for the internal combustion engine including a reversible electric motor and having a starting switch or switches provided with alternative forward or reverse contacts.

Such starting arrangements obviate mechanical gear changing with its attendant reverse gearing by starting up the engine electrically to run in either forward or reverse direction and the object of the invention is to provide electrically-operated means for simultaneously locking against tilt when starting in reverse.

According to the said invention an outboard propulsive unit for attachment to a boat comprises in combination a mounting structure for securing to a boat's transom, an internal combustion engine supported thereby, a downwardly extending driving shaft from the engine, a shaft casing surrounding said driving shaft, a propeller casing mounted on the bottom of said shaft casing and carrying a propeller drivingly geared to said driving shaft, said shaft casing being hinged to said mounting structure so that it may tilt in relation thereto, a lock to prevent tilting, and an electric starter for the engine including a reversible electric motor furnished with a switch for starting the motor in reverse, characterised in that electrical means are incorporated for moving the said lock into its locking position, said means being energised from the electric starter circuit as and when the said switch is operated to start the motor in reverse. The said electrical means for moving the lock is advantageously an electric solenoid, while a practical form of lock is a pivoted latch formed with a hook end which engages over a lock-pin on the mounting structure, and said lock-pin may be adjustable into alternative positions on the mounting structure which would be useful in accommodating the locking device to different angles which may be assumed by the unit when mounted on various designs of boat stern. It is to be understood that the invention is not restricted to a pivoted latch

lock as other forms (e.g. sliding bolt type) may be equally well operated by the said electrical means.

In order that the said invention may be readily understood an embodiment thereof will be described by way of example with the aid of the accompanying drawings in which:

Figure 1 is an elevation of a propulsion unit according to the invention;

Figure 2 is an enlarged view of the combined electric solenoid and tilt locking latch; and

Figure 3 is an electrical diagram hereinafter referred to.

Referring to Figure 1 the propulsion unit includes a mounting structure in the form of a clamping frame **1** to embrace the transom at the stern of a boat and to be clamped thereon by the clamping screw **2**. On top of said mounting structure **2** there is supported an internal combustion engine **4**, and said engine has a downwardly extending driving shaft within a casing **5** which surrounds the same. The casing **5** is rotatably carried for steering within a bearing **6** and the latter with the casing is hinged at **3** to the mounting **1**.

By this hinge **3** the shaft casing **5** together with the bearing **6** and engine **4** may tilt together with the propeller casing, propeller and electric starter referred to later.

On the bottom of the shaft casing **5** there is mounted a propeller casing **7** carrying a propeller **8** which is geared to the driving shaft within the casing **5** so as to be driven thereby.

To prevent the assembly of engine **4**, propeller **8** and associated elements **5**, **6** and **7** tilting when the craft is moving in reverse there is a lock which in the embodiment is in the form of a latch **9** having a hooked end **10** adapted to drop over a hook-pin **11** mounted on the structure **1**. This hook-pin **11** may be adjustable in any one of a series of holes **12** in a quadrant plate **13** forming part of the structure **1**. The latch **9** is pivoted at **14** to the bearing **6** and is operated by the movable armature **15** of a solenoid **16** which is pivoted to the latch at **17**.

Associated with the engine **4** there is an electric starter including a reversible electric motor within the casing **18** the whole being surrounded by a cowling **19**. The motor is driven by a battery **20** (Figure 3) a lead **21** of which is introduced into a switch assembly box **22** containing a reversing solenoid, and ignition coils for the spark plugs **23**. Such a reversible motor, starter and ancillary components is a known article of manufacture and forms no part per se of the present invention. In the form shown it includes a switch **24** through which current to the starter motor flows through the lead **25** for driving the starter in the forward direction indicated by F in Figure 3, or alternatively through the lead **26** for driving the starter in the reverse direction indicated by the reference letter R in Figure 3. Thus the switch contacts determine the forward and reverse operation of the engine **4** according to the position of the switch. There is, of course, an intermediate "OFF" position of the switch. In some cases two separate switches may be used, one for forward drive and one for reverse. The starter switch, as sometimes employed with motor starter apparatus of the kind used for the engines of outboard motors, may be a combined ignition and starter switch, alternatively the ignition switch may be separate.

According to the essential feature of the invention electrical means are incorporated for moving the locking latch **9** into its locking position with the hooked end **10** engaged over the locking-pin **11** when the switch **24** is operated to the reverse position as shown dotted in Figure 3. The end of the latch **9** is secured in pivotal

fashion at **17** to a rod extension **27** from the movable armature **15** of the aforesaid solenoid **16**. As indicated in Figure 3 the solenoid **16** is included in the circuit supplying current to the reversing side of the starter motor and accordingly when the switch is operated to energise the electric motor so that it drives the starter reversely then, simultaneously, the solenoid **16** is energised and the locking latch **9** is moved into its locking engagement with the pin **11**. With separate switches for forward and reverse, the solenoid **16** would, of course, be included in the circuit made and broken by the reverse switch.

I claim:

1. An outboard propulsive unit for attachment to a boat comprising in combination a mounting structure for securing to a boat's transom, an internal combustion engine supported thereby, a downwardly extending driving shaft from the engine, a shaft casing surrounding said driving shaft, a propeller casing mounted on

the bottom of said shaft casing and carrying a propeller drivingly geared to said driving shaft, said shaft casing being hinged to said mounting structure so that it may tilt in relation thereto, a lock to prevent tilting, and an electric starter for the engine including a reversible electric motor furnished with a switch for starting the motor in reverse, characterised in that electrical means are incorporated for moving the said lock into its locking position, said means being energised from the electric starter circuit as and when the said switch is operated to start the motor in reverse.

2. An outboard propulsive unit according to claim 1 in which the electrical means for moving the lock is an electric solenoid.

3. An outboard propulsive unit according to claim 1 in which the lock is a pivoted latch formed with a hook end for engaging over a lock-pin on the mounting structure.

No references cited.