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3,613,482

FORWARD-REVERSE SELECTOR WITH STARTER SWITCH

Filed March 27, 1970

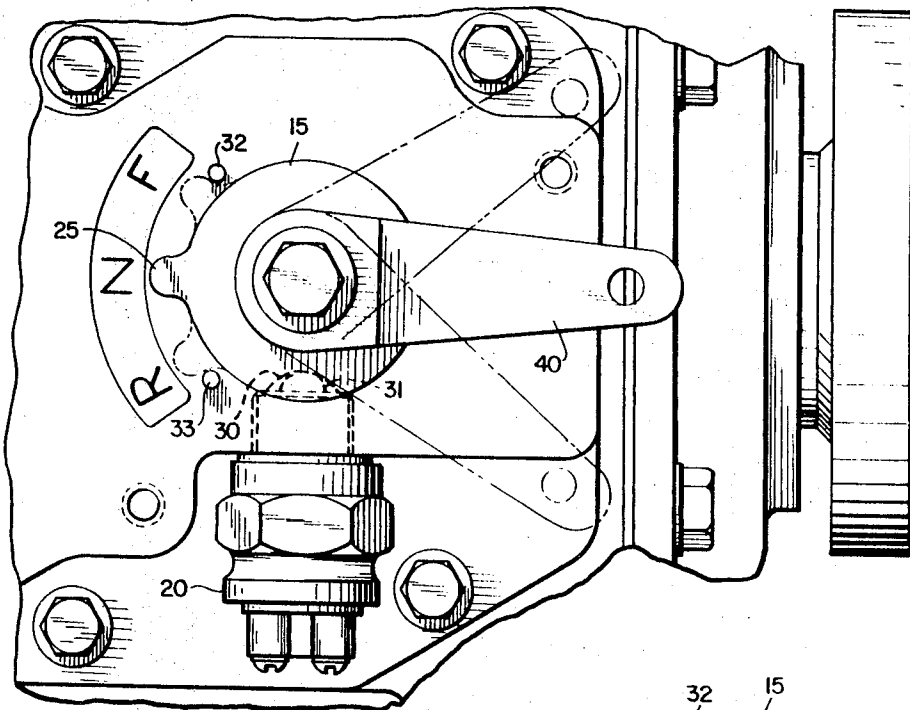


FIG. 2

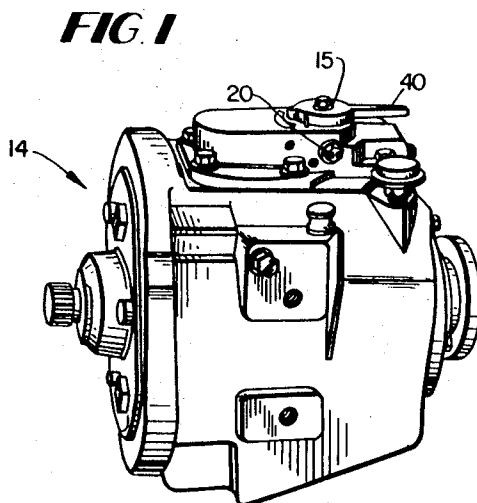


FIG. 1

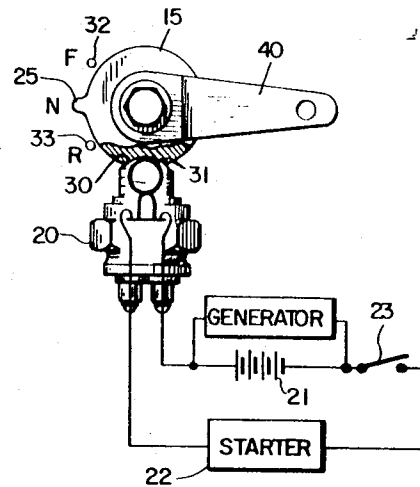


FIG. 3

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FORWARD-REVERSE SELECTOR WITH STARTER SWITCH

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1 Claim

ABSTRACT OF THE DISCLOSURE

A system is provided for preventing the starting of a marine engine when the transmission control means is in any position other than neutral. A series electrical circuit is provided which includes a power source (battery), a neutral start switch operatively associated with the transmission control means, the ignition switch in the boat control panel, and a starter.

A system is provided for preventing inadvertent starting of a marine engine when the transmission is placed in forward or reverse. In marine transmissions known today, a source of maintenance trouble is inherent in starting an engine in other than neutral, as this places a strain on the entire power system. Dangerous movement of the boat is also involved. Spring biased detents have been utilized to lightly hold the transmission control means in neutral position, thereby inhibiting inadvertent disengagement. However, with the number of inboard engine boats in use today, it will be recognized that numerous dangerous inadvertent start-ups do occur with damaging overloads placed on the power system.

This invention provides an electrical circuit which requires the system to be in neutral position before the ignition switch of the control panel can energize the starter. This system includes a neutral start switch which can replace the spring biased detent for lightly holding the transmission control means against inadvertent movement.

These and further objects and advantages of the present invention will become more apparent upon reference to the following specification, appended claim and drawing wherein:

FIG. 1 is a perspective view of a marine hydraulic transmission;

FIG. 2 is a top view showing the transmission control means in neutral position, dotted lines showing the forward and reverse positions; and

FIG. 3 is a schematic circuit diagram of the system.

FIG. 1 shows a hydraulic marine transmission 14 of the type which has been in use for a number of years and which includes the transmission control means 15. As is well known, this transmission control means 15 is a hydraulic valve which on pivotal movement directs fluid to engage a multiple disc clutch for forward operation and which causes the engagement of a reverse band when in reverse position. Suitable gear trains transmit the desired rotating movement to the propeller.

The marine engine ignition system of this invention involves a neutral start switch 20 mounted in the transmission 14, a power source 21, a starter 22 and an ignition switch 23, these units being electrically connected in series as shown in FIG. 3. The block showing the generator indicates the battery charging system from the engine.

The neutral start switch 20 is operatively associated

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with the transmission control means 15 to be electrically closed when the control means is in neutral position N. When the control means 15 moves to forward position F or reverse position R, the neutral start switch 20 is electrically opened, thereby preventing engine starting.

In the embodiment shown, the transmission control means 15 is a hydraulic control valve which is pivotal in one direction from a central neutral position N to a forward position F and in the other direction to a reverse position R.

FIG. 3 shows the hydraulic control valve 15 having a peripheral arcuate opening 30 for receiving the outwardly biased actuating ball 31 of the neutral start switch 20. When the hydraulic control valve is pivoted to forward or reverse positions, its nose 25 hits stops 32 or 33, respectively, to limit its pivotal movement and the ball 31 is cammed inwardly by the hydraulic control valve 15 to electrically open the neutral start switch 20 thereby preventing inadvertent starting of the engine in these positions.

The usual control means are connected to the hydraulic control valve arm 40 for actuation from the control panel of the boat.

We claim:

1. In a marine engine ignition system having a hydraulic transmission with a hydraulic control valve pivotable in one direction from a central neutral position to a forward position and in the other direction to a reverse position, the improvement:

said hydraulic control valve having a swingable lever including a peripheral arcuate opening extending radially outwardly;

a neutral start switch having actuating ball outwardly biased into said arcuate opening when said control valve is in neutral position;

a battery;

a starter; and

an ignition switch;

said neutral start switch, battery, starter, and ignition switch being in series electrically;

said neutral start switch being electrically closed when its actuating ball is positioned in said arcuate opening, and said ball and arcuate opening holding the control valve in neutral position until a predetermined force is applied, said arcuate opening being of a predetermined arcuate length conforming to said neutral position whereby said actuating ball is moved inwardly by said control valve to electrically open the neutral start switch when the control valve is pivoted to forward position or reverse position to allow starting of the engine only when the control valve is in neutral position, a pair of spaced apart stops adjacent to and abutable by said control valve to limit pivotal movement of the hydraulic control valve to the forward position and the reverse position.

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192—.098; 200—61.88; 251—297