June 20, 1961 H. S. WILLIAMS 2,988,929

IDLE STOP INTERLOCK

Filed Aug. 13, 1959 2 Sheets-Sheet 1

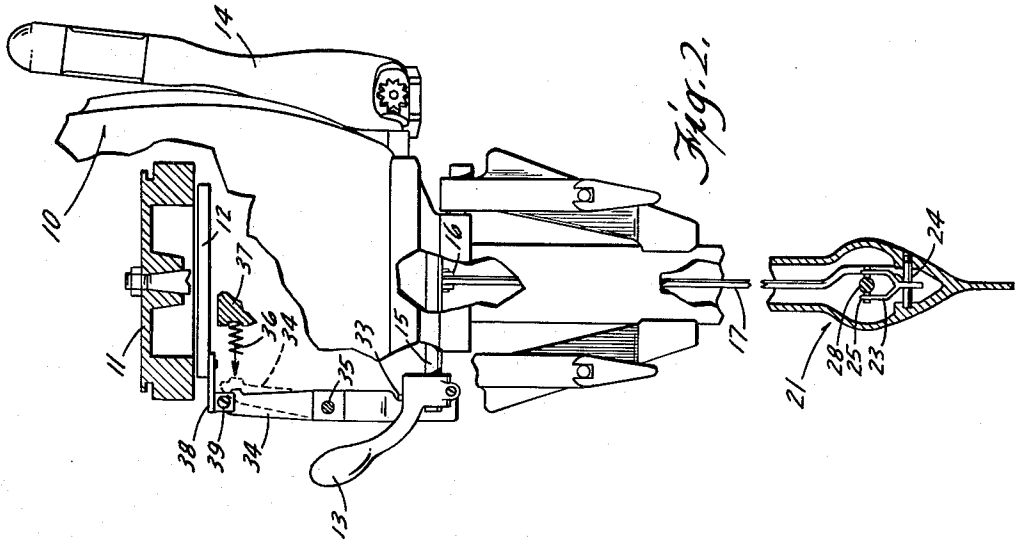

Fig. 2.

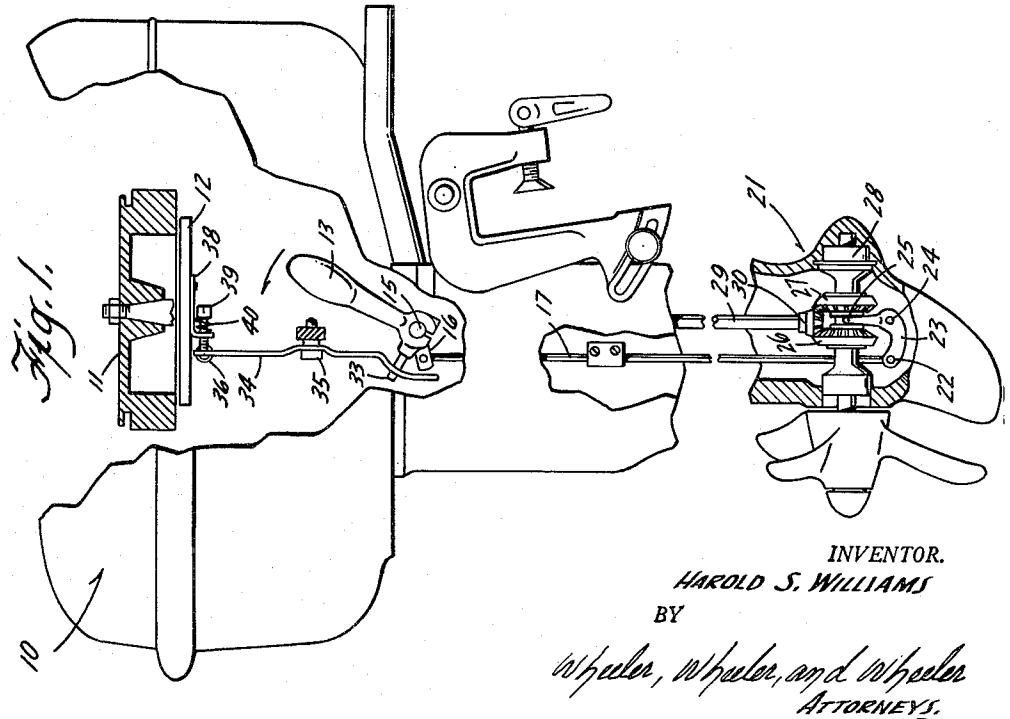

Fig. 1.

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Fig. 3.

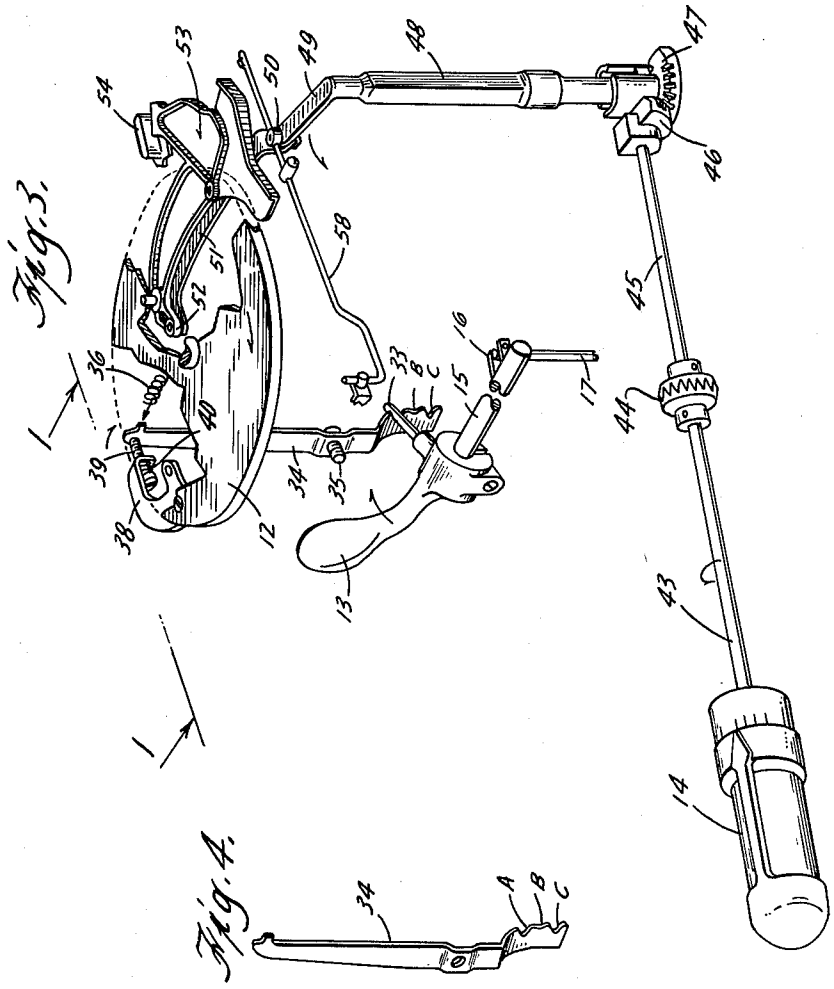
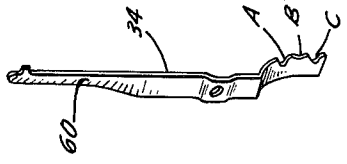


Fig. 4.

Fig. 5.



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IDLE STOP INTERLOCK

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6 Claims. (Cl. 74—472)

This invention relates to improvements in a device for preventing the undesired stopping of an outboard boat motor when it is being operated at slow speed or when the gears are being shifted from forward to reverse or vice versa.

When a boat driven by an outboard motor is approaching a dock or is being used for purposes requiring relatively slow speed for a considerable length of time or when the boat is being maneuvered so that the gears are frequently shifted to change the direction of motion of the boat, the engine should continue to run at low speed but many engines will stop unless the operator has considerable skill and experience in their operation. Upon stopping of the engine control of the boat is lost, which is at least annoying and can be dangerous under some conditions of water currents or of wind.

In two-cycle internal combustion engines particularly, the speed is controlled in part by the timing of the spark and in part by the throttle opening and these may be operated by a single operator control having provisions for optimum coordination. A connection is therefore provided between the timer plate and the carburetor throttle valve for maintaining the proper relation between the two speed control factors. This connection may be constructed according to the disclosure of Patent 2,906,251. The specific form of the connection is not a part of the present invention, and so will not be shown in full. A conventional magneto (not shown) is mounted on the timer plate to interact with a magnet rotated by the crankshaft of the engine, the interaction occurring at an angular position of the crankshaft determined by the angular position of the timer plate, as is conventional. Other methods of varying the timing may also be used. The carburetor and throttle may also be conventional. According to my invention means are also provided for inter-connecting the plate controlling the spark timing with the gear shift lever to limit the movement of the timer plate when gears are engaged, so that the throttle valve cannot be completely closed so long as gears are engaged. The present device is in effect an interlock between the gear shift lever, the timer plate and the throttle, which is so adjusted that the throttle and timer plate cannot be shifted below idling speed position while the gears are engaged for either forward or reverse drive, thus freeing the operator from the necessity of looking at the throttle to see the mark for idling position. This is particularly important in an emergency when speed must be reduced without stopping the engine. The interlock does not interfere with stopping the motor when the gear shift lever is in neutral position so that no gears are engaged.

In the drawings:

FIGURE 1 is a side elevational view of an outboard boat motor with parts broken away and parts in section to show the structure involved in the present invention;

FIGURE 2 is a view similar to FIGURE 1 but taken at 90° to FIGURE 1;

FIGURE 3 is a perspective view of the control means and interlocks showing their relationship;

FIGURE 4 is a perspective view of the lock lever for acting on the gear shift lever; and

FIGURE 5 is a modified form of the lock lever shown in FIGURE 4, which allows emergency stopping of an engine equipped with such lock while the gears are engaged.

FIGURES 1 and 2 show an outboard motor generally indicated at **10**, and including an internal combustion engine (not shown) having a flywheel **11** and a timer plate **12**, a gear shift lever **13** and a tiller handle **14** (see FIGURE 3). The gear shift lever **13** is pivoted at **15** and is connected by a linkage **16** with a shifter rod **17** extending into lower unit **21** where the rod is pivoted at **22** to a shifter yoke **23**, the yoke being pivoted on the lower unit at **24**. As the shifter rod **17** is moved vertically, the yoke **23** acts on shift collar **25** to couple gear **26** or gear **27** to propeller shaft **28** to rotate it in the desired direction or uncouple it altogether, power being supplied to gears **26** and **27** continuously by way of a drive shaft **29** and a pinion **30** in constant mesh with gears **26** and **27**.

The gear shift lever **13** carries a pin **33** which is selectively engageable in notches A, B or C (see FIGURES 3, 4 and 5) on a shifter lock lever **34** pivoted at **35** to swing toward and away from the gear shift lever pin **33** under the action of spring **36** which is seated on a fixed portion **37** of the power head **10**. A bracket **38** is mounted on the timer plate **12** to support a screw **39** under the action of a compression spring **40** acting between the bracket and the screw head, the screw being adjustable to extend into the path of movement of the lock lever **33**. The spring may be replaced by a lock nut or any well known means for holding screw **39** in its adjusted position. The notches A, B and C of lock lever **34** are respectively engaged by the shifter lever pin **33** when the gear shift lever **13** is in forward, neutral and reverse positions.

Referring now to FIGURE 3 a handgrip on the tiller handle **14** is attached to an oscillating shaft **43**, with a universal joint **44** connecting said shaft with a shaft **45** having a bevel gear **46** thereon. The bevel gear **46** acts on a bevel gear **47** to transmit motion to a rock shaft **48**, the rock shaft being turned clockwise as the handgrip **14** is turned in a direction to accelerate the motor. A rocker arm **49** on the upper end of the rock shaft **48** is pivoted at **50** to a link **51** having its remote end pivoted at **52** to a plate **53** itself pivoted to the under side of the timer plate **12** and movable against a stop **54**. When the link **51** is moved by clockwise oscillation of the rocker arm **49**, the link **51** presses on the pivot **52** in clockwise direction and rotates the timer plate **12** to advance the timing of the spark to the internal combustion engine in a wellknown manner. At the same time a rod **58** mounted on the pivot **50** acts on the throttle valve of the carburetor (not shown) to open the valve.

When the gear shift lever **13** is in neutral position with its pin **33** engaging notch B of lock lever **34**, neither gear **26** nor gear **27** is engaged with the propeller shaft **28** and the engine may be started, idled or stopped. Stopping of the engine is accomplished by turning the handle **14** to turn the timer plate **12** in counter-clockwise direction and close the throttle. When the gear shift lever **13** is in neutral position, the lock lever **34** is in the dotted line position shown in FIGURE 2, so that the timer plate **12** may carry the screw **39** past the lock lever **34** and the screw does not interfere with the starting, idling or stopping of the engine.

However, when the gear shift lever **13** is in position to engage its pin **33** in either notch A or notch C of lock lever **34** for engagement of gear **26** or **27** to the propeller shaft **28**, the lock lever **34** is in the solid line position shown in FIGURE 2. Movement of the timer plate **12** in counter-clockwise direction to retard the spark and to close the throttle valve now brings the screw **39** against the lock lever **34** to limit the degree to which the speed control means may be turned in closing direction and

the engine continues to operate at an idling speed dependent on the adjustment of the screw **39**. Such screw adjustment is made only after the engine is warm so that a desired low speed is maintained at all times during usual engine operation.

If desired, the lock lever **34** may be provided with a lateral cam surface indicated at **60** in FIGURE 5 by twisting the lock lever so that forcible turning of the timer plate **12** will bypass the lock for stopping the engine under emergency conditions. Forcible turning of the timer plate causes the screw **38** to press on cam surface **60** and forces it into the dotted line position shown in FIGURE 2. In such position, the screw **38** may move past the lock so that the timer plate **12** can be rotated sufficiently to bring the throttle valve into completely closed position.

I claim:

1. In an internal combustion engine provided with ignition means, fuel supply means, manually operated engine speed control means for simultaneously adjusting the fuel supply and the timing of the ignition means, a plurality of gears for transmitting power from the engine to a propeller, and a manually operable control for shifting the gears, the improvement comprising a lever adapted to be pivoted into different positions related to positions of the gear shift control, and means on the engine speed control for engagement with the lever in several of its positions of engagement with the gear shift control whereby freedom of movement of the speed control means in the direction for stopping the engine is limited.

2. The device of claim 1 in which said stop means is mounted for movement into and out of the path of movement of said lever for preventing movement of the gear shift control into positions engaging the gears in driving relation when said speed control is set below the predetermined minimum.

3. In an outboard motor provided with an engine, gear means controlled by a gear shift lever, ignition timing control means mounted on a timer plate, the timing of the ignition being responsive to the position of said timing control means and said timer plate being movable to vary said position, a carburetor having a throttle, and an

engine speed control adapted to adjust the timer plate and the throttle, the improvement comprising a device for preventing undesired stoppage of the engine when the gear shift lever is in gear engaging position, a lock lever urged into position for engagement with the gear shift lever in any one of three gear shift lever positions, and an adjustable screw mounted on the timer plate for engagement with the lock lever upon movement of the timer plate in engine-stopping direction.

4. The device of claim 3 in which a gear shift engaging cam surface is provided on said lock lever to urge it into position for engagement by the screw only when the gear shift lever is in position for meshing of the gears.

5. A device for limiting the stoppage of a fuel burning outboard motor engine geared to a propeller and having a lever for shifting the gears, said engine being provided with a timer plate mounted for limited rotation with respect to the engine, with a linkage for rotating the plate, and with means for controlling the timing of the ignition of fuel in said engine upon rotation of the plate, said plate being further provided with means to control the flow of fuel to said engines as said plate is rotated, said device comprising, a lock lever engaged with the gear shift lever and pivoted into different positions upon movement of the gear shift lever, said lock lever extending adjacent the timer plate, and a stop screw adjustably mounted on the timer plate for engagement with the lock lever in two positions of the gear shift lever, engagement of the lock and the screw being adapted to limit movement of the timer plate and of the linkage in the direction for stopping the engine.

6. The device of claim 5 in which the lock has a cam surface engageable by the screw whereby forcible movement of the timer plate and of the linkage forces the lock out of engagement with the gear shift lever regardless of the position of the gear shift lever.

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