

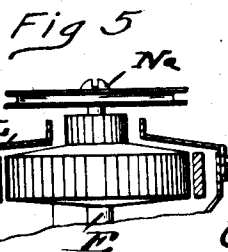
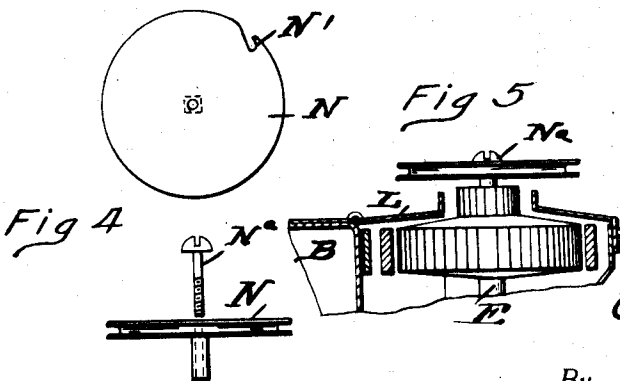
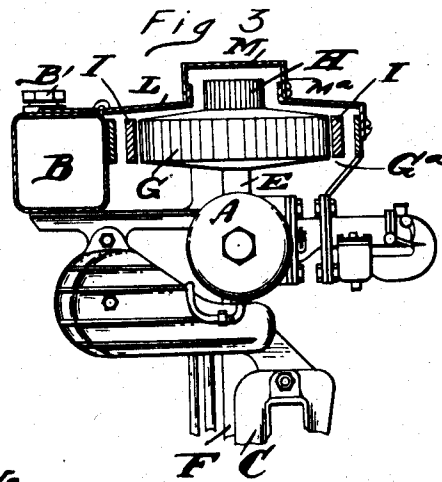
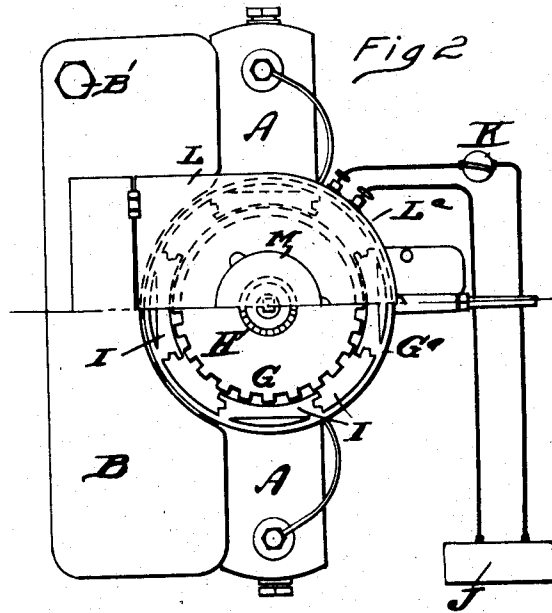
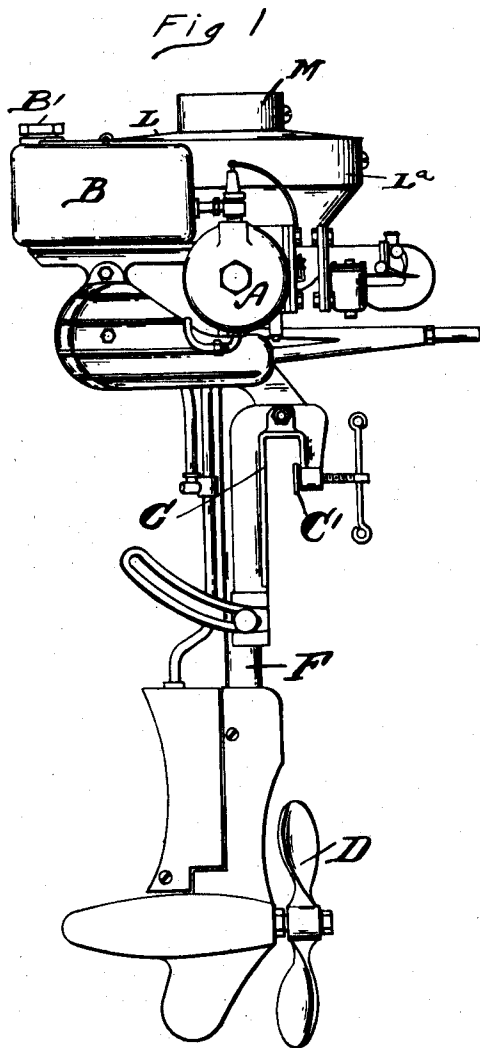
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STARTER GENERATOR FOR OUTBOARD MOTORS

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STARTER-GENERATOR FOR OUTBOARD MOTORS

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15 Claims. (Cl. 115—17)

My invention relates to outboard motors and particularly to means for starting outboard motors of the internal combustion type.

The instant starting of an outboard motor is not only difficult to secure, but that fact is well known and freely admitted by all owners of outboard power-driven boats.

Due to the effort required to crank an outboard motor and the continuous cranking so frequently necessary before the engine can be made to operate under its own power, the use and sale of this type of motor has been greatly curtailed,—in fact so much so that the number of outboard motor boats driven by women and children is quite limited.

A further objection to the use of outboard motors as now constructed is due to the hazard offered anyone seated at the stern of the boat who may inadvertently or carelessly bring his arm into contact with the rapidly rotating fly wheel or its whirling crank handle.

A further objection to their use is that it becomes necessary for the pilot, or the one in charge of the motor, to be seated in the stern of the boat—that he may be there to start the motor whenever necessary,—to steer the boat, and to perform all other duties required for the continuous operation of the craft.

The primary object therefore of this invention is to overcome these and other objections to outboard motors by combining therewith in a single unit, a starting generating dynamo, whereby the outboard motor may be started and controlled from the bow of the boat without manual effort.

One object of the present invention is to eliminate the usual fly wheel employed on motors of this type and to install in its place a single unit double duty starting generating dynamo, the armature of which is mounted on the drive-shaft of the engine to serve as a fly wheel for the latter in addition to its use as a starting generating dynamo. The field magnets are stationary, and are supported by an annular wall surrounding the revolving armature,—the annular wall being either integral or not with the cylinder walls of the engine, as may be desired. A sheet metal cover houses the starting generating dynamo, protecting it from the weather, and those seated in the stern of the boat from injury through accidental contact with the revolving parts. A starting switch and storage battery connected with the starting generating dynamo may be located near the bow of the boat, also a steering wheel connected with the outboard motor,—or an independent rudder mechanism may be installed for steering the boat.

With the foregoing and other objects in view which will appear as the description proceeds, the invention further resides in the combination and arrangement of parts and in the details

of construction hereinafter described and claimed, it being understood that changes may be made in the precise embodiment of the invention hereinafter disclosed without departing from the spirit of the same.

In the drawing accompanying this specification:

Figure 1 is a side elevation of an outboard motor, embodying a starting generating dynamo unit in place of the usual fly wheel of the motor.

Figure 2 is a diagrammatic plan view of same, with parts cut away and in section to show the starting generating dynamo;—indicating also diagrammatically a storage battery, starting switch and connections between the battery and the starting generating dynamo.

Figure 3 is a fragmentary side elevation of the outboard motor with parts in section, taken on or about line 3—3 of Figure 1.

Figure 4 are detail views of an auxiliary manually operated starting attachment detachably secured to the commutator end of the armature-engine shaft—comprising a plan and side elevation of the starting disc and a screw-bolt for attaching it to the shaft.

Figure 5 is a fragmentary side elevation of the starting generating dynamo, with the housing for same in section,—showing the detachable manually operated starting attachment installed thereon.

Referring now to the letters of reference placed upon the drawing:

A denotes the cylinders of an outboard motor. B the gasoline tank and B¹ a removable fuel filling cap. C indicates the usual clamping jaw, fitted with an adjustable clamping member C¹, for securing it to the stern of a boat. D denotes a propeller blade driven in the usual manner by the rotation of the combined armature and engine drive-shaft E, enclosed within a tube F.

G denotes the armature of a starting generating dynamo G^a, mounted upon the combined armature-engine drive-shaft E, and H is a commutator on the end of the shaft.

I indicates the field magnets secured to an annular housing encircling the starting generating dynamo and preferably integral with the cylinder walls of the outboard motor.

J is a storage battery and K is a starting switch adapted to close a circuit between the battery and the starting generating dynamo.

L denotes a hinged cover secured to the gasoline tank adapted to close the open end of the housing L^a, and M is a closure cap fitted to an upstanding annular collar M^a in the cover surrounding the commutator, by removing which access may be had to the commutator and its brushes.

N indicates a grooved removable rotatable disc adapted to be secured by a bolt N^a to the upper

end of the combined armature and engine drive shaft. E, upon removing the closure cap M from the housing. N¹ is a hook in its marginal edge, to receive the looped end of a cord (not shown) for manually starting the motor, in the event of the starting generating dynamo failing to operate.

Having indicated the several parts by reference letters, the construction and operation of the device will be readily understood.

- 10 To start the engine under its own power, the starting switch K is operated to close the circuit between the storage battery J and the starting generating dynamo G^a, which operating as a motor turns the engine over until the latter operates in the usual manner under its own power.
- 15 The engine now operating, at a relatively greater speed, automatically converts the motor into a generator, which recharges the battery K, and following the recharging of the battery the starting switch is opened until it is again necessary to start the motor.

No attempt has been made to show the ignition system of the outboard motor as this is well understood and forms no part of the present invention.

- 25 Having thus described my invention, what I claim is:

1. In a device of the character described, the combination of an outboard motor and a starting generating dynamo, including stationary field magnets for the starting generating dynamo supported co-axially with the drive-shaft of the outboard motor, an armature for the starting generating dynamo mounted on the drive shaft of the outboard motor, whereby it may serve the dual purpose of an armature for the starting generating dynamo and a fly wheel for the outboard motor,—the usual fly wheel of the outboard motor having been eliminated; a storage battery in circuit with the starting generating dynamo; and means for controlling said circuit.

2. A structure as specified in claim 1, in combination with a housing attached to the frame of the outboard motor inclosing the starting generating dynamo.

3. In a device of the character described, a unitary structure comprising an outboard motor; a starting generating dynamo, comprising stationary field magnets and an armature for the dynamo mounted on the drive-shaft of the outboard motor, serving also as a fly wheel for the latter; an inclosing housing for the starting generating unit, including a removable cover, whereby access may be obtained to said dynamo.

4. In a device of the character described, the combination of an outboard motor and a starting generating dynamo, supported co-axially with the drive-shaft of the outboard motor, an armature for the starting generating dynamo mounted on the drive-shaft of the outboard motor, whereby it may also serve as a fly wheel for the outboard motor; a commutator for the starting generating dynamo on the end of the drive-shaft; a storage battery in circuit with the starting generating dynamo; means for controlling said circuit; an inclosing housing for the starting generating dynamo and a removable cap on said housing, whereby access may be had to the commutator.

5. A structure as specified in claim 1 in combination with auxiliary detachable means adapted to be mounted upon the drive-shaft of the outboard motor, for manually starting said outboard motor.

6. An outboard motor comprising a combustion engine having a drive shaft and electric motor having a rotating part carried by the same drive shaft and a fixed part carried by the engine housing, the rotating electric motor part constituting a fly wheel for the combustion engine.

7. In an outboard motor a combustion engine and an electric starting motor therefor having a common drive shaft and a common casing part, the electric motor having a rotating part which constitutes the fly wheel for the engine.

8. In an outboard motor of the internal combustion engine type, the combination with a motor-generator co-axial with and operatively connected to the crank-shaft of the engine for starting the engine, of a hand-operated cranking wheel operatively connected to the motor generator co-axial with said crank-shaft for rotating the revoluble part of motor-generator.

9. In an outboard motor of the internal combustion type, the combination with an electric starter having a fly-wheel armature section operatively connected to the crank-shaft of the engine co-axial therewith, of a cranking element operatively connected to said armature section co-axial therewith for rotating the same.

10. In an outboard motor of the internal combustion type, the combination with an electric starter having a flywheel armature section operatively connected to the crank-shaft of the engine co-axial therewith, of a hub secured to the upper end of said armature section to extend upwardly therefrom co-axial therewith, and a cranking element operatively connected to the hub for rotating the armature section and crank-shaft.

11. The combination with an outboard motor of the opposed cylinder internal combustion engine type having a crank-case connecting the cylinders, and an upright crank-shaft journaled in the lower and upper walls of the crank-case, of a motor generator having a flywheel armature section operatively connected to the upper end of the crank-shaft for rotating said shaft to start the engine, and adapted to be rotated by said shaft for generating electric current.

12. The combination of an outboard motor engine having an upward crank shaft extension for a flywheel, an electric starter generator having a rotary part to engage the shaft extension and a surrounding stationary field portion supported by the engine casing.

13. In an outboard motor, a combustion engine having an upward crank shaft extension for a flywheel, a fuel tank supported by the engine casing in nested relation to a flywheel, and an electric starter mounted on the shaft extension and supported by the engine casing in nested relation to the fuel tank, the starter part mounted on the shaft extension operating as the engine flywheel.

14. An electric starter for an outboard motor engine which has a vertical shaft extending above the engine casing, the starter having fixed and movable parts supported by the shaft and engine casing and occupying the space normally provided for the engine flywheel.

15. An outboard motor having a combustion engine, and an electric starter therefor for a common drive shaft in combination with an auxiliary starting device for the engine having an axis common to that of the drive shaft.

WILLIAM H. ANDERSON.