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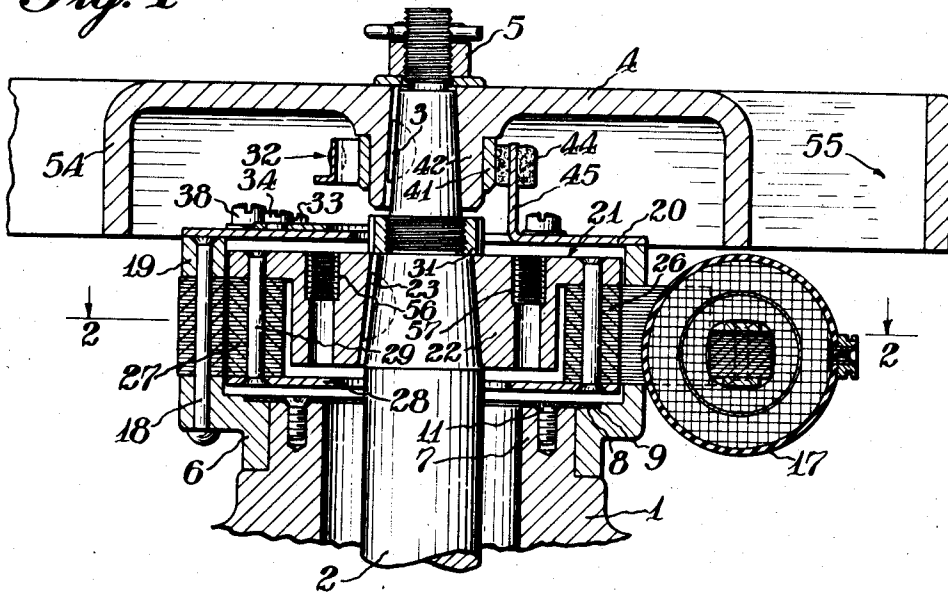
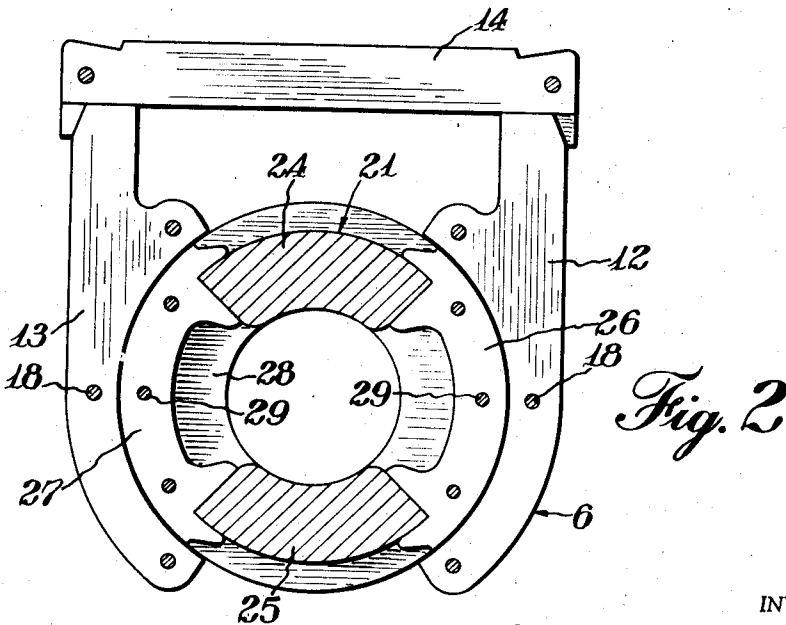
E. B. NOWOSIELSKI
HIGH TENSION MAGNETO GENERATOR

2,195,706

Filed March 30, 1937

2 Sheets-Sheet 1

Fig. 1



Witness:
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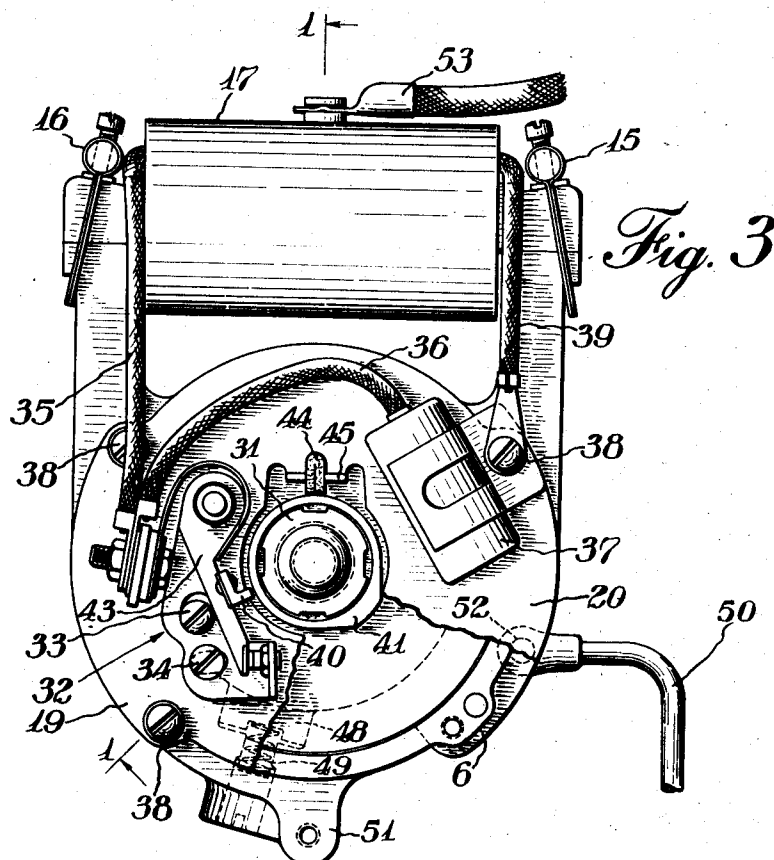
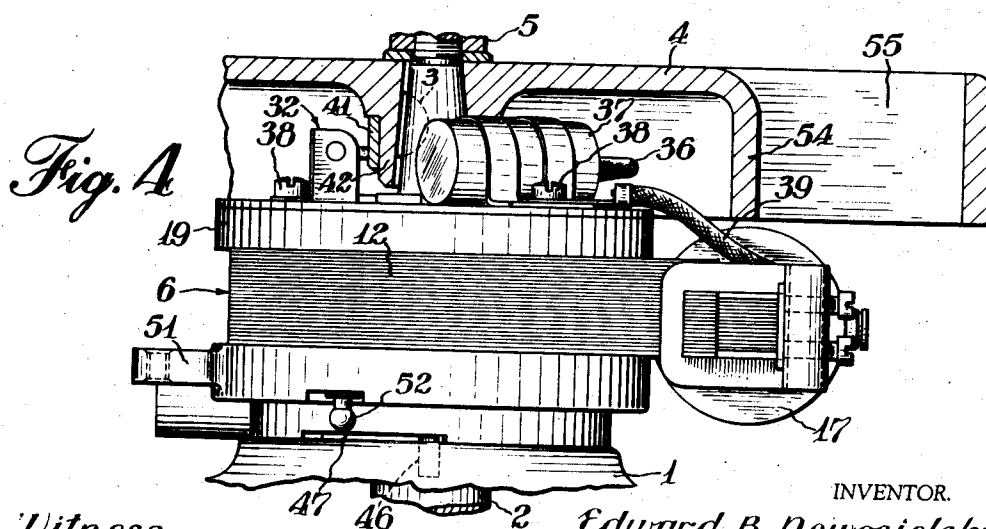
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UNITED STATES PATENT OFFICE

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HIGH TENSION MAGNETO GENERATOR

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Application March 30, 1937, Serial No. 133,853

4 Claims. (Cl. 171-209)

The present invention relates to a high tension magneto generator for ignition of internal combustion engines and more particularly to a magneto especially adapted for use with small high speed engines such as outboard motors for boats.

Commercial types of outboard motors are commonly of the two-stroke cycle type and in order to deliver a comparatively large amount of power in proportion to their light weight and small dimensions, they are designed to operate at high rotative speeds. It is desirable, therefore, that ignition magnetos to be used therewith be small and light and have small well-balanced rotors, while being capable of delivering a powerful accurately timed spark.

It is an object of the present invention to provide a novel ignition magneto for internal combustion engines which is small and light, well-balanced and efficient and capable of long periods of use at high rotative speeds without requiring service of any kind.

It is another object to provide such a device which is incorporated with the engine to be ignited, the rotor being mounted directly on the engine shaft.

It is another object to provide such a device in which the parts are cooled, protected and partially enclosed by means of the flywheel of the engine to be ignited.

It is a further object to provide such a device in which the parts can be inspected and adjusted, and their operation checked while the engine flywheel is removed.

It is another object to provide such a device in which the induction coil and core, and the breaker mechanism are formed as a sub-assembly unit.

It is another object to provide such a device in which such sub-assembly is rotatably mounted on the engine casing and held frictionally in adjusted position.

It is another object to provide such a device including an arrangement whereby adjustment of the stator sub-assembly to advance the timing of the spark also serves to open the engine throttle.

Further objects and advantages will be apparent from the following description taken in connection with the accompanying drawings in which:

Fig. 1 is a vertical sectional view of a preferred embodiment of the invention taken substantially on the line 1-1 of Fig. 3;

Fig. 2 is an illustration of the magnetic circuit of the magneto corresponding closely to a hori-

zontal sectional view substantially on the line 2-2 of Fig. 1;

Fig. 3 is a plan view of the device, parts being broken away for the sake of clarity; and

Fig. 4 is a side elevation of the same, also with parts broken away.

Referring first to Fig. 1 of the drawings, numeral 1 indicates a portion of the casing of an internal combustion engine which may be of the type commonly used for propelling small water-craft and termed outboard motors by reason of the fact that they are normally mounted in a vertical position at the rear of the craft to be propelled. An engine shaft 2 which may be the crankshaft of the engine extends vertically from the casing 1 and has suitably keyed thereon as indicated at 3 a flywheel 4, suitable retaining means indicated at 5 being provided.

According to the present invention, a high tension magneto for igniting the internal combustion engine is located between the casing 1 and flywheel 4, and comprises a stator 6 adjustably mounted on a cylindrical extension 7 of the casing and retained thereon by suitable means such as a ring 8 bearing on a shoulder 9 of the stator and anchored to the casing by means of screws 11.

As best shown in Figs. 2 and 3, the stator 6 comprises a pair of arcuate pole shoes 12 and 13 of suitable laminated material and a cross member 14 of similar material connecting the same and clamped thereto as by means of detachable clamps 15 and 16. The member 14 serves as the core of an induction coil 17 of conventional design which is arranged to supply the ignition currents. Pole shoes 12 and 13 are rigidly connected to the stator frame 6 as by means of rivets 18 passing therethrough and through a clamp ring 19 mounted thereon. A cover plate 20 is mounted on the clamp ring and fixed thereto as by means of studs 23.

A magnetic rotor indicated generally by numeral 21 is provided for energizing the core of the induction coil. As here shown, this rotor comprises a hub 22 keyed as indicated at 23 on the shaft 2 and carrying a pair of arcuate magnets 24 and 25, the like poles of which are connected by pole shoes 26 and 27 of suitable laminated magnetic material arranged concentrically within the stator pole shoes 12, 13 and arranged to cooperate therewith. The magnets 24 and 25 are retained in position by an interlocking connection with the pole shoes 26, 27 as shown, being held in assembled relation by a ring 28 clamped to the hub 22 of the rotor by rivets 29. The rotor is maintained in position on the shaft

2 by suitable means such as a clamp nut 31 threaded on the shaft and bearing against the hub of the rotor.

Breaker mechanism of more or less conventional design indicated generally by numeral 32 (Fig. 3) is adjustably mounted on the cover plate 20 of the stator as by means of studs 33 and 34 and is connected by a lead 35 to the primary of the coil and by a lead 36 to a condenser 37 mounted on the cover plate 20 by means of one of the studs 38. The opposite end of the primary of coil 17 is preferably grounded to the cover plate by means of a lead 39 conveniently attached to the same stud 38.

Means for operating the breaker mechanism is provided in the form of a cam 41 non-rotatably mounted on the hub 42 of the flywheel in position to engage an insulated rubbing block 40 mounted on the arm 43 of the breaker mechanism. Means are provided for maintaining a film of oil on the cam 41 in the form of an oil wick 44 mounted on the cover plate 20 and maintained in engagement with the cam by means of a bracket 45 preferably formed integrally with the cover plate.

The rotary adjustment of the stator frame 6 on the engine casing 1 is limited by suitable means such as a pin 46 mounted in the casing and projecting into an arcuate groove 47 in said stator. The adjustment of the stator is frictionally maintained by means here illustrated in the form of a friction member 48 mounted in the stator frame 6 and pressed against the cylindrical portion 7 of the housing by means of a spring 49. A lug 51 is formed on the stator frame 6 for actuation by any suitable manual control.

In installations of this character, it is desirable to control the timing of the spark in conjunction with the actuation of the engine throttle so that the spark will be retarded when the engine throttle is closed, and advanced when the throttle is opened. As here shown, this is accomplished by mounting an actuating member, here shown in the form of a stub shaft with a spherical head 52 on the stator frame 6, in position to receive any suitable form of connecting device such as a link 50 for operating the throttle of the engine therefrom.

The output of the secondary of the induction coil 17 is conducted by a lead 53 to the spark plug of the engine, it being noted that the present arrangement is particularly adapted for use in connection with a single-cylinder two-cycle engine.

In the operation of the device, rotation of the rotor 21 causes the flux of magnets 24 and 25 to reciprocate through the core 14 of coil 17. Cam 41 is so arranged that the breaker mechanism 32 opens the primary circuit of the coil at the time of greatest flow of current therethrough, and the secondary current so generated is used to ignite the engine, the position of the stator 6 on the casing 1 being so regulated as to cause the spark to occur at the proper time with respect to the functioning of the engine.

The formation of the stator 6 as a sub-assembly unit carrying the breaker mechanism, coil and condenser renders it possible to adjust and test the device with the flywheel removed by simply using a dummy cam on the shaft in place of the cam mounted on the flywheel.

It will be noted that the flywheel 4 is preferably formed as a solid disc throughout its central portion and provided with a downwardly extend-

ing flange 54 serving to partially enclose and protect the parts of the magneto. The periphery of the flywheel is preferably formed as a fan as indicated at 55 in order to promote cooling of the magneto. It will be noted in this connection that the rotary motion of the flywheel will cause the air to be thrown outwardly away from the magneto so that the magneto is cooled by a current of air coming up from below. This serves to protect the magneto from spray thrown up by the craft on which it is mounted.

The mounting of the felt wick 44 separately from the breaker mechanism permits the use of a liberal supply of lubricant on the wick without the danger of its flowing over the parts of the breaker mechanism and possibly fouling the contact points.

Threaded openings 56 and 57 are provided for convenience in removing the rotor from the shaft by means of a gear-pulling device.

Although but one form of the invention has been shown and described in detail, it will be understood that other forms are possible and that various changes may be made in the dimensions and arrangements of the parts without departing from the spirit of the invention as defined in the claims appended hereto.

What is claimed is:

1. In combination with an internal combustion engine having a casing and a shaft journaled therein, a high tension magneto for igniting said engine including a stator frame member adjustably mounted on the casing, stator pole members mounted thereon, an induction coil having a core detachably fixed to the stator pole members, a cover plate fixed to the stator frame member, a breaker device mounted on the cover plate and connected to said coil, a magnetic rotor mounted on the shaft within said stator for cooperation with said stator pole members, and a cam rotatable with the shaft for operating the breaker mechanism.

2. In combination with an internal combustion engine having a casing and a shaft journaled therein, a high tension magneto for igniting said engine including a magnetic rotor mounted on the shaft, a stator frame member adjustably mounted on the casing, stator pole members mounted thereon in position to cooperate with the rotor, an induction coil having a core detachably fixed to the stator pole members, a cover plate fixed to the stator frame member, a breaker device for said coil adjustably mounted on the cover plate, a cam rotatable with the shaft for operating said breaker mechanism, and a lubricating device for said cam mounted on a bracket integral with said cover plate.

3. In a high tension magneto, a rotor including a plurality of arcuate permanent magnets, pole shoes interposed between like poles of adjacent magnets and interfitted therewith, a mounting hub member and means for fixing said pole shoes thereto to rigidly mount the magnets thereon, and a stator comprising a frame, pole shoes mounted thereon in position to cooperate with the rotor pole shoes, an induction coil having a core connected to said stator pole shoes, a cover plate detachably mounted on said frame, breaker mechanism for the coil mounted on the cover plate, and a cam rotatable with the rotor in position to operate the breaker mechanism.

4. In a high tension magneto, a rotor including a plurality of arcuate permanent magnets, pole shoes interposed between like poles of adjacent

magnets and interfitting therewith, a mounting hub member and means for fixing said pole shoes thereto to rigidly mount the magnets thereon, and a stator unit comprising a frame, pole shoes mounted thereon in position externally of said rotor to cooperate with the rotor pole shoes, an induction coil having a core associated with said

stator pole shoes, and a cover plate detachably mounted on said frame to partially enclose said rotor, a breaker mechanism for the coil mounted on the cover plate, a cam rotatable with the rotor in position to operate the breaker mechanism.

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