

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 0 594 903 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:

24.07.1996 Bulletin 1996/30

(51) Int Cl.⁶: **F01M 3/02**, F01M 1/16

(21) Application number: **92309829.7**

(22) Date of filing: **27.10.1992**

(54) **Lubricating oil pump drive circuit for two-cycle engine**

Schmierölpumpensteuerschaltung für eine Zweitakt-Brennkraftmaschine

Circuit de commande de pompe à lubrifiant pour un moteur à combustion interne à deux temps

(84) Designated Contracting States:
DE ES FR GB IT

(43) Date of publication of application:
04.05.1994 Bulletin 1994/18

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EP 0 594 903 B1

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Description

This invention relates to engine lubricating oil pump drive circuits and, more particularly, to a lubricating oil pump drive circuit suitable for a small-size two-cycle engine such as is used for motorbikes and snow mobiles or as an outboard engine.

There is known a lubricating oil pump which supplies a minimum necessary amount of lubricating oil separately from fuel to a two-cycle engine to satisfy the exhaust gas restriction of the engine. Such a lubricating oil pump has been driven by mechanically transmitting the engine rotation to it. With such engine, however, restriction is imposed on the place of its disposition. In addition, high rotational ratio gear or the like is required to permit very slight discharge.

To overcome the above drawbacks, a lubricating oil pump is used, which is mechanically separated from the engine and uses a battery mounted in the vehicle as a power source. It is driven periodically by a signal obtained by frequency dividing an engine rotation signal. Such a lubricating oil pump can supply the minimum necessary amount of lubricating oil in proportion to the engine rotation rate. However, the usual small-size two-cycle engine does not have any battery but has only a magneto generator. The magneto generator is incapable of driving a lubricating oil pump while the engine is idling and also the headlights, direction indicators and so forth are driven. Therefore, any mechanically separated lubricating oil pump has not been used for any small-size two-cycle engine for motorbike or the like without any battery.

JP-A-62150020 describes an oil pump drive circuit in which an AC output is rectified by a diode, charging a capacitor. The capacitor is discharged through the primary coil of an ignition coil.

In accordance with the present invention, there is provided a lubricating oil pump drive circuit for an engine comprising an AC generator driven by the engine; and a capacitor for storing energy obtained through rectification of an output of the AC generator characterised in that the engine is a two-cycle engine, the output of the AC generator is provided by an auxiliary coil, and in that the capacitor is discharged periodically by a switching element through a solenoid of a solenoid pump.

The invention provides a lubricating oil pump drive circuit, which permits the minimum necessary amount of lubricating oil to be supplied reliably to a two-cycle engine without any battery and also permits the lubricating oil pump to be installed in any desired place.

In a preferred arrangement a common line is used for both the power source line and the engine rotational rate signal line, thus requiring low assembling cost.

The energy obtained through rectification of the output of the AC generator driven by the engine is stored in the capacitor for a predetermined period of time. Thus, it is possible to arrange such that sufficient energy is supplied for one stroke driving of the solenoid pump

even with low generated power output during idling and that the solenoid pump is driven once for every fixed engine rotation.

This arrangement permits reliable supply of an amount of lubricating oil in proportion to the engine rotational rate.

In the conventional case where a battery is mounted, a lubricating oil pump drive circuit which uses the battery as a power source, requires wiring of an engine rotational rate signal line for obtaining the lubricating oil pump drive timing in addition to the power source wiring, thus increasing the assembling cost.

Preferably, the circuit further comprises an engine rotation monitor circuit connected to the output of the AC generator for determining the rotation rate of the engine, the monitor circuit also being connected to the switching element to control the turn-on time of the switching element in accordance with the monitored rotation rate.

The AC frequency of the output of the AC generator driven by the engine or the DC pulse frequency after rectification and prior to smoothing, is proportional to the engine rotational rate. Thus, the engine rotational rate signal can be obtained from either of these frequencies, thus permitting the lubricating oil pump to be driven at a rate proportional to the engine rotational rate. This means that a common line may be used for the power line, i.e. the output line of the AC generator, and the engine rotational rate signal line.

With the lubricating oil pump drive circuit for a two-cycle engine according to the invention, the lubricating oil pump can be mechanically separated from the engine, thus permitting increase of the freedom of the engine design and also avoiding excessive supply of the lubricating oil.

Further, the circuit may be used with a small-size two-cycle engine without any battery as well, permitting reliable supply of lubricating oil in proportion to the engine rotational rate during idling as well.

Further, with the lubricating oil pump drive circuit for a two-cycle engine according to the invention, neither harness nor connector is needed for the engine rotational rate signal, thus reducing the assembling cost.

In summary, in the preferred example, a capacitor stores energy obtained through rectification of the output of an AC generator driven by an engine, and it is discharged periodically by a transistor through a solenoid of a solenoid pump. A pulse prior to smoothing is obtained from the output of the AC generator through a diode to be used as an engine rotational rate signal for obtaining a transistor turn-on timing. The lubricating oil pump is driven independently of the engine rotation, and it is possible to supply the minimum necessary lubricating oil reliably in a two-cycle engine without any battery as well. A common line is provided to a power source line and an engine rotational rate signal line, thus providing a lubricating oil pump drive circuit for a two-cycle engine, which requires a low assembling cost.

Some examples of lubricating oil pump drive circuits according to the invention will now be described with reference to the accompanying drawings, in which:-

Fig. 1 is a circuit diagram showing an embodiment of the lubricating oil pump drive circuit for a two-cycle engine according to the invention;

Fig. 2(a) is a side view showing the construction of an AC generator used in the embodiment of the invention;

Fig. 2(b) is a connection diagram showing the electric connection of the AC generator;

Fig. 3 is a graph showing the output voltage of the generator used in the embodiment of the invention;

Fig. 4 is a sectional view showing a lubricating oil pump for a two-cycle engine used in the embodiment of the invention;

Fig. 5 is a graph showing the terminal voltage across a solenoid of the lubricating oil pump for a two-cycle engine used in the embodiment of the invention;

Fig. 6 is a circuit diagram showing a modification of the embodiment shown in Fig. 1;

Fig. 7 is a circuit diagram showing a different embodiment of the invention;

Fig. 8 is a circuit diagram showing a further embodiment of the invention; and

Fig. 9 is a circuit diagram showing a still further embodiment of the invention.

An embodiment of the lubricating oil pump drive circuit for a two-cycle engine according to the invention will now be described. Fig. 1 is a circuit diagram showing the embodiment of the lubricating oil pump drive circuit for a two-cycle engine according to the invention. Referring to the Figure, designated at 1 is an AC generator, more definitely a magneto generator, which is driven from the engine and has an auxiliary coil connected to the input terminals of the embodiment of the circuit.

Fig. 2 shows the construction of the AC generator 1. The rotor 11 of the generator is a four-pole permanent magnet having two N poles and two S poles and is driven from the engine. The rotor 11 has an inner yoke, on which three coils 12 are wound such as to hold an angle difference of 90 degrees. The coils 12 are connected in series so that their electromotive forces are added together and connected between an auxiliary coil output terminal and the ground. The output from the auxiliary coil output terminal is used as power source for lamps and horn and also used as power source coupled between the input terminals of the embodiment of the circuit. Designated at 14 is a coil of a high voltage power source for ignition. Designated at 13 is a pick-up coil for ignition timing.

Fig. 3 shows the auxiliary coil output waveform of the AC generator 1 during idling of the engine. The input terminals shown in Fig. 1 are connected to the input side of a bridge rectifier including diodes D1 to D4. The out-

put side of the bridge rectifier is connected between the ground and plus terminal of a capacitor C2, which has its minus terminal grounded and is charged by an output current from the bridge rectifier.

The plus terminal of the capacitor C2 is connected to one of output terminals of the embodiment of the circuit. The capacitor C2 is discharged through a solenoid 4 connected between the output terminals and a transistor 5 connected between one of the output terminals and the ground. The transistor 5 is on-off controlled by its base current supplied to it through a resistor R11, thus controlling the conduction start timing and conduction period of the solenoid 4. A series circuit including a diode D6, a Zener diode ZD2 and a resistor R2, is connected between the output terminals and serves as a snubber circuit to protect the transistor 5 against the inverse electromotive force voltage generated when the solenoid 4 is de-energized.

The circuit from the diode D7 to the resistor R11 constitutes a circuit for supplying the base current to the transistor 5, and the circuit from the diode D5 to the capacitor C5 constitutes a DC constant voltage power supply for the circuit noted above. More specifically, a three-terminal regulator 2 has its input terminal connected to the plus terminal of a capacitor C3, which is charged by a series circuit of a diode D5 and a resistor R1, and its output terminal connected along with the plus terminal of a capacitor C5 to a DC power supply terminal 3. The capacitor C3 and a Zener diode ZD1 in parallel therewith serve to stabilize the input voltage to the three-terminal regulator 2, and the capacitor C5, which is connected between the output terminal of the three-terminal regulator 2 and the ground, serves to stabilize the output voltage of the DC constant voltage power supply.

A series circuit including a diode D7, a resistor R3 and a parallel circuit of a capacitor C6 and a resistor R4, is provided between one of the input terminals and the ground. A pulse voltage is generated on the juncture point between the resistors R3 and R4, and a base current is supplied as a pulse current to a transistor 6. A series circuit of diodes D8 and D9 is connected between the ground and the juncture point between the resistors R3 and R4 and serves to restrict the magnitude of the voltage applied to the base of the transistor 6. The transistor 6 has its collector connected through a resistor R5 to a DC power supply terminal 3 and its emitter connected through a resistor R6 to the ground. The collector and emitter of the transistor 6 are also connected to the base and emitter, respectively, of a digital transistor 7, thus forming a commonly termed Schmitt trigger circuit. The collector of the digital transistor 7 is connected through a resistor R7 to the DC power supply terminal 3 and also connected to a clock terminal CK of a frequency divider 9. Thus, pulses corresponding in number to those impressed on the base of the transistor 6 are supplied to the clock terminal CK of the frequency divider 9.

The frequency division factor of the frequency divid-

er 9 may be selected depending on the size of the engine, and in this embodiment it is 256. The frequency divider 9 divides the pulse input to its clock terminal CK and outputs the resultant pulses to the base of a digital transistor 8. The digital transistor 8 has its collector connected through a resistor R8 to the DC power supply terminal and its emitter connected to the ground. The collector of the digital transistor 8 is also connected through a capacitor C8 to the juncture point of a series circuit of resistors R9 and R10 connected between the DC power supply terminal and the ground. The juncture point between the resistors R9 and R10 is connected to a trigger terminal Trig of a one-shot multi-vibrator 10 and also connected through a diode D10 to the DC power supply terminal. The voltage on the juncture point between the resistors R9 and R10 is normally held at a voltage, which is obtained by dividing the DC power supply voltage between the resistors R9 and R10. When the digital transistor 8 is turned on, however, a differential component of the falling of the collector voltage is impressed to generate a "low" pulse. When the digital transistor 8 is turned off, the differential component of the rising of the collector voltage is impressed on the juncture between the resistors R9 and R10 to generate a "high" pulse. A diode D10 provides for peak restriction on the "high" pulse such that the DC power supply voltage is not exceeded.

The one-shot multi-vibrator 10 includes a timer circuit IC, which has its threshold terminal Th and discharge terminal Dis. These terminals are connected to a CR circuit constituted by a variable resistor VR and a capacitor C9. The voltage at an output terminal Vo is held at "high" level for a predetermined period of time from the impression of a "low" pulse on the trigger terminal as determined by the time constant of the CR circuit. While the "high" level voltage prevails at the output terminals of the one-shot multi-vibrator, the base current to the transistor 5 is supplied through a resistor R11. A capacitor C11 is connected between a control terminal Cont and the ground to remove noise in the internal control voltage in the one-shot multi-vibrator 10.

Surge absorbers SA1 and SA2 are provided to absorb surges, and capacitors C1, C4, C7 and C10 serve to absorb noise. The solenoid 4 is provided in a lubricating oil pump as shown in Fig. 4. As shown in Fig. 4, the solenoid 4 is wound on a sleeve 15. An inner yoke 17 extends into and is secured to the sleeve 15. A plunger 16 is slidably disposed in the sleeve 15 such that it faces the inner yoke 17. A conical coil spring 20 presses the plunger 16 leftwards. A magnetic circuit is formed by the plunger 16 and inner yoke 17 together with an end yoke 19 and an outer yoke 18, and an oil path is formed in a nipple 24, the outer yoke 18, the plunger 16 and the inner yoke 17. On the oil path are provided a valve 21 biased by a compression coil spring 22 and a valve 23 fitted in the inner yoke 17. Oil is thus allowed to flow only from the nipple 24 to the inner yoke 17. The solenoid pump having the above construction supplies lubricat-

ing oil in proportion to the number of strokes of the plunger.

With the above construction, normally the transistor 5 is "off", and in this state the output energy from the AC generator 1, which is driven by the engine, is stored in the capacitor C2. Pulses obtained through half-wave rectification of the output of the AC generator 1 by the diode 7 are counted by the frequency divider 9. At an instant when the count reaches 256, base current is supplied from the one-shot multi-vibrator 10 through the resistor R11 to the transistor 5, whereupon the transistor 5 is held "on" for a predetermined period of time. At this time, charge stored in the capacitor C2 is discharged through the solenoid 4. Fig. 5 shows the terminal voltage across the solenoid at the time of the discharge. As the solenoid 4 is energized, the magnetic circuit of the lubricating oil pump generates a magnetic flux to attract the plunger 16 to the side of the inner yoke 17 so as to close the magnetic gap between the inner yoke 17 and plunger 16, thus causing discharge of lubricating oil. For the next charging of the capacitor C2, the plunger 16 is returned to the position shown in Fig. 4 by the restoring force of the conical coil spring 20.

As shown above, the output energy of the AC generator 1 is stored in the capacitor while the engine is rotated a predetermined number of rotations, and the stored energy drives the lubricating oil pump. Thus, the lubricating oil pump can be driven reliably even at a low rotational rate of the engine during idling thereof. A magnet generator which is usually used for an engine provides a high output peak voltage even when the rotational rate of the engine is low, as shown in Fig. 3. In addition, the capacitor is charged up to the vicinity of the output peak voltage. Thus, sufficient energy is stored. Further, with the high voltage built up by the charging a high rush energy is provided to the solenoid, which is an inductive load, thus obtaining a high attraction force to attract the plunger. The period of time to energize the solenoid is set to an optimum value by the variable resistor VR independently of the rotational rate of the engine. The peaks of the output voltage of the AC generator 1 are counted, and the lubricating oil pump is driven for every predetermined number of rotations of the engine. Thus, it is possible to supply an amount of lubricating oil proportional to the rotational rate of the engine.

Fig. 6 shows a modification of the above embodiment. In this modification, a circuit from a NOR gate 25 to a resistor R11, as shown enclosed in a phantom line rectangle in Fig. 6, is substituted for the circuit from the digital transistor 8 to the resistor R11 shown in Fig. 1. The remainder of the construction is the same as that of the circuit shown in Fig. 1. The output of frequency divider 9 is input to the input terminal of the NOR gate 25. The output of the NOR gate 25 is input to the input terminals of NOR gates 26 and 27. The output terminal of the NOR gate 26 is connected through a circuit including a resistor Rt, a diode D11 and a capacitor Ct to the ground. The common juncture point to the resistor

Rt, diode D11 and capacitor Ct is connected through a resistor R12 to the other input terminal of the NOR gate 27. The base current to transistor 5 is supplied from the output terminal of the NOR gate 27 through the resistor R11. This circuit can attain the function of the one-shot multi-vibrator shown in Fig. 1 as well. In the circuit of Fig. 6, the conduction time of the transistor 5 is determined by the time constant of the CR circuit formed by the resistor Rt and the capacitor Ct.

Fig. 7 shows a different embodiment of the invention. In this case, the output of AC generator 1 is half-wave rectified by a diode D12 before charging capacitor C2. The charge stored in the capacitor C2 is discharged through solenoid 4 and transistor 5. A base current supply circuit (not shown) for the transistor 5 supplies a base current periodically like the previous embodiment. This embodiment is inferior in the energy storage efficiency but has the effects of the invention.

Fig. 8 shows a further embodiment of the invention. In this case, the output of AC generator 1 is half-wave rectified by a transistor 28 before charging capacitor C2. The charge stored in the capacitor C2 is discharged through solenoid 4 and transistor 5. The base current to the transistor 28 is supplied through a resistor R13 only for the half-wave rectification period. The emitter-collector voltage across the transistor is lower than the forward voltage drop across the diode, and thus the terminal voltage of charging across the capacitor can be increased compared to the case of the diode.

Fig. 9 shows a still further embodiment of the invention. In this case, the output of AC generator 1 is rectified by a full-wave rectifier including diodes D1 to D4 and then coupled through a diode D13 to capacitor C2 for the charging thereof. While the charge stored in the capacitor C2 drives the solenoid, the circuit to this end is the same as that in the previous embodiments and hence is not shown. Positive pulse voltage appears from the anode of the diode D13, and these pulses are utilized as the engine rotational rate signal. The circuit for controlling the solenoid according to the engine rotational rate signal is the same as the circuit including the diode D7 and the other elements shown in Fig. 1 and hence is not shown.

In this embodiment, unlike the circuit shown in Fig. 1, double the pulses are counted per one rotation of the engine. However, since the frequency division factor of the frequency divider can be set as desired, the same function as that of the circuit of Fig. 1 can be obtained. In this embodiment, the terminal voltage of charging across the capacitor C2 is reduced by an amount corresponding to the forward voltage drop across the diode D13 but has the effects of the invention.

The embodiments described in the foregoing are by no means limitative. For example, it is possible to provide the transistor 5 on the upstream side of the solenoid 4. Also, it is possible to replace the transistor 5 with other switching elements such as thyristors.

Claims

1. A lubricating oil pump drive circuit of an engine comprising an AC generator (1) driven by the engine; and a capacitor (C2) for storing energy obtained through rectification of an output of the AC generator (1) characterised in that the engine is a two-cycle engine, said output of the AC generator is provided by an auxiliary coil (12), and in that the capacitor is discharged periodically by a switching element (5) through a solenoid (4) of a solenoid pump.
2. A circuit according to claim 1, further comprising an engine rotation monitor circuit connected to the output of the AC generator (1) for determining the rotation rate of the engine, the monitor circuit also being connected to the switching element (5) to control the turn-on time of the switching element in accordance with the monitored rotation rate.
3. A circuit according to claim 2, further comprising a Schmitt trigger circuit to which is fed the output from the AC generator prior to rectification, the output of the Schmitt trigger circuit being applied to a frequency divider (9); and a switching element control signal generator connected to the output of the frequency divider (9) for generating a control signal in response to the output from the frequency divider (9) for application to the switching element (5).
4. A circuit according to claim 3, wherein the switching element control signal generator comprises a one-shot multi-vibrator (10).
5. A circuit according to claim 3, wherein the switching element control signal generator comprises a logic circuit providing the function of a one-shot multi-vibrator.
6. A circuit according to claim 5, wherein the logic circuit comprises a first NOR gate (25) to one input of which is fed the output from the frequency divider (9); second and third NOR gates (26,27) to which the output from the first NOR gate (25) is fed in parallel; and a circuit comprising a resistor (Rt) and rectifier (D11) connected in parallel and to the output of the second NOR gate (26), the output of the circuit being fed to the other input of the third NOR gate (27), wherein the output of the third NOR gate (27) constitutes the switching element control signal.
7. A circuit according to any of the preceding claims, wherein rectification of the output from the AC generator (1) is provided by a bridge rectifier.
8. A circuit according to any of claims 1 to 6, wherein the output of the AC generator is half-wave rectified

by a diode (D12).

9. A circuit according to any of claims 1 to 6, wherein the output of the AC generator is half-wave rectified by a transistor (28).

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10. A circuit according to any of claims 1 to 6, wherein the output from the AC generator (1) is full-wave rectified by a full-wave rectifier, the output of the rectifier being fed to a further diode (D13) before charging the capacitor (C2).

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11. A circuit according to any of the preceding claims, wherein a snubber circuit (D6, ZD2, R2) is connected in parallel across the solenoid (4).

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12. A circuit according to any of the preceding claims, wherein the switching element (5) comprises a transistor.

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13. A circuit according to any of the preceding claims, wherein the output of the AC generator is provided by a plurality of auxiliary coils (12) connected in series.

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14. A circuit according to claim 3, wherein each of the auxiliary coils (12) are disposed at substantially 90 degrees to adjacent auxiliary coils.

15. A circuit according to any of the preceding claims, wherein the auxiliary coil(s) (12) also act as a power source for other components, such as lamps and/or a horn.

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16. A two-cycle engine comprising a lubricating oil pump including a solenoid (4), and a control circuit according to any of the preceding claims for controlling operation of the pump.

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17. An engine according to claim 16, wherein the AC generator further comprises an ignition coil (14) which acts as a high voltage power source for ignition of the engine.

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18. An engine according to claim 16 or 17, wherein the AC generator further comprises a pick-up coil (13) for timing the ignition of the engine.

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Patentansprüche

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1. Steuerschaltung für eine Schmierölpumpe einer Brennkraftmaschine, die einen von der Maschine angetriebenen Wechselspannungsgenerator (1) und einen Kondensator (C2) aufweist, um die Energie zu speichern, die durch Gleichrichtung eines Ausgangs des Wechselspannungsgenerators (1) erhalten wurde,

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dadurch gekennzeichnet, daß die Brennkraftmaschine eine Zweitakt-Brennkraftmaschine ist, daß der Ausgang des Wechselspannungsgenerators von einer Hilfsspule (12) geliefert wird und daß der Kondensator periodisch durch ein Schaltelement (5) über einen Elektromagneten (4) einer Elektromagnetpumpe entladen wird.

2. Steuerschaltung nach Anspruch 1, welche außerdem eine Maschinendrehzahl-Überwachungsschaltung aufweist, die an den Ausgang des Wechselspannungsgenerators (1) angeschlossen ist, um die Drehzahl der Maschine zu bestimmen, wobei die Überwachungsschaltung auch an das Schaltelement (5) angeschlossen ist, um die Anschaltzeit des Schaltelementes gemäß der überwachten Drehzahl zu steuern.

3. Steuerschaltung nach Anspruch 2, welche außerdem eine Schmitt-Trigger-Schaltung aufweist, der der Ausgang des Wechselspannungsgenerators vor der Gleichrichtung zugeführt wird, wobei der Ausgang der Schmitt-Trigger-Schaltung einem Frequenzteiler (9) zugeführt wird und wobei ein Steuersignalgenerator für das Schaltelement an den Ausgang des Frequenzteilers (9) angeschlossen ist, um ein Steuersignal gemäß dem Ausgang des Frequenzteilers (9) zu schaffen und um diesen Ausgang an das Schaltelement (5) anzulegen.

4. Steuerschaltung nach Anspruch 3, bei welcher der Steuersignalgenerator für das Schaltelement ein monostabiler Multivibrator (10) ist.

5. Steuerschaltung nach Anspruch 3, bei welcher der Steuersignalgenerator für das Schaltelement eine Logikschaltung aufweist, die die Funktion eines monostabilen Multivibrators hat.

6. Steuerschaltung nach Anspruch 5, bei welcher die Logikschaltung ein erstes NOR-Gatter (25) aufweist, an dessen einen Eingang der Ausgang des Frequenzteilers (9) angelegt ist, während zweite und dritte NOR-Gatter (26 und 27) vorgesehen sind, an die der Ausgang des ersten NOR-Gatters (25) parallel zueinander angelegt wird, wobei eine Schaltung, bestehend aus einem Widerstand (R_1) und einem Gleichrichter (D11), parallel an den Ausgang des zweiten NOR-Gatters (26) angeschaltet ist und der Ausgang der Schaltung dem anderen Eingang des dritten NOR-Gatters (27) zugeführt wird, so daß der Ausgang des dritten NOR-Gatters (27) das Steuersignal für das Schaltelement bildet.

7. Steuerschaltung nach einem der vorhergehenden Ansprüche, bei welcher die Gleichrichtung des Ausgangs vom Wechselspannungsgenerator (1) durch einen Brückengleichrichter geliefert wird.

8. Steuerschaltung nach einem der Ansprüche 1 bis 6, bei welcher der Ausgang des Wechselspannungsgenerators durch eine Diode (D12) einer Halbwellengleichrichtung unterworfen wird.
9. Steuerschaltung nach einem der Ansprüche 1 bis 6, bei welcher der Ausgang des Wechselspannungsgenerators durch einen Transistor (28) einer Halbwellengleichrichtung unterworfen wird.
10. Steuerschaltung nach einem der Ansprüche 1 bis 6, bei welcher der Ausgang des Wechselspannungsgenerators (1) durch einen Doppelweg-Gleichrichter gleichgerichtet wird und der Ausgang des Gleichrichters einer weiteren Diode (D13) zugeführt wird, bevor der Kondensator (C2) geladen wird.
11. Steuerschaltung nach einem der vorhergehenden Ansprüche, bei welcher eine Dämpfungsschaltung (6, ZD2, R2) parallel zu dem Elektromagneten (4) geschaltet ist.
12. Steuerschaltung nach einem der vorhergehenden Ansprüche, bei welcher das Schaltelement (5) aus einem Transistor besteht.
13. Steuerschaltung nach einem der vorhergehenden Ansprüche, bei welcher der Ausgang des Wechselspannungsgenerators von mehreren Hilfsspulen (12) geliefert wird, die in Reihe geschaltet sind.
14. Steuerschaltung nach Anspruch 13, bei welcher jede Hilfsspule (12) in einem Winkelabstand von im wesentlichen 90° gegenüber benachbarten Hilfsspulen angeordnet ist.
15. Steuerschaltung nach einem der vorhergehenden Ansprüche, bei welcher die Steuerspule(n) (12) auch als Energiequelle für weitere Bauteile, beispielsweise für Lampen und/oder eine Hupe, dienen.
16. Zweitakt-Brennkraftmaschine, welche eine Schmierölpumpe mit einem Elektromagneten (4) und einer Steuerschaltung gemäß einem der vorhergehenden Ansprüche aufweist, um die Arbeitsweise der Pumpe zu steuern.
17. Brennkraftmaschine nach Anspruch 16, bei welcher der Wechselspannungsgenerator weiter eine Zündspule (14) aufweist, die als Hochspannungsenergiequelle zur Zündung der Brennkraftmaschine wirkt.
18. Brennkraftmaschine nach den Ansprüchen 16 oder 17, bei welcher der Wechselspannungsgenerator außerdem eine Aufnahmespule (13) aufweist, um

die Brennkraftmaschine in zeitlicher Folge zu zünden.

5 Revendications

1. Circuit de commande de pompe à lubrifiant d'un moteur comprenant un générateur à courant alternatif (1) commandé par le moteur; et un condensateur (C2) pour stocker de l'énergie obtenue par le redressement d'une sortie du générateur à courant alternatif (1), caractérisé en ce que le moteur est un moteur à deux temps, ladite sortie du générateur à courant alternatif est fournie par une bobine auxiliaire (12), et en ce que le condensateur est déchargé périodiquement par un élément de commutation (5) par l'intermédiaire d'un électro-aimant (4) d'une pompe à électro-aimant.
2. Circuit selon la revendication 1, comprenant en outre un circuit de contrôle de rotation de moteur connecté à la sortie du générateur à courant alternatif (1) pour déterminer la vitesse de rotation du moteur, le circuit de contrôle étant aussi connecté à l'élément de commutation (5) pour contrôler le temps de mise en route de l'élément de commutation conformément à la vitesse de rotation observée.
3. Circuit selon la revendication 2, comprenant en outre un circuit de déclenchement Schmitt auquel est alimentée la sortie du générateur à courant alternatif avant redressement, la sortie du circuit de déclenchement Schmitt étant appliquée à un diviseur de fréquence (9); et un générateur de signal de contrôle d'élément de commutation connecté à la sortie du diviseur de fréquence (9) pour générer un signal de contrôle en réponse à la sortie du diviseur de fréquence (9) pour application à l'élément de commutation (5).
4. Circuit selon la revendication 3, dans lequel le générateur de signal de contrôle d'élément de commutation comprend un multivibrateur monostable (10).
5. Circuit selon la revendication 3, dans lequel le générateur de signal de contrôle d'élément de commutation comprend un circuit logique remplissant la fonction d'un multivibrateur monostable.
6. Circuit selon la revendication 5, dans lequel le circuit logique comprend une première porte NI (25) vers une entrée de laquelle est alimentée la sortie du diviseur de fréquence (9); des deuxième et troisième portes NI (26, 27) auxquelles la sortie de la première porte NI (25) est alimentée en parallèle; et un circuit comprenant une résistance (R_t) et un

redresseur (D11) connectés en parallèle et à la sortie de la deuxième porte NI (26), la sortie du circuit étant alimentée vers l'autre entrée de la troisième porte NI (27), où la sortie de la troisième porte NI (27) constitue le signal de contrôle d'élément de commutation.

7. Circuit selon l'une quelconque des revendications précédentes, dans lequel le redressement de la sortie du générateur à courant alternatif (1) est fourni par un redresseur à pont. 5
8. Circuit selon l'une quelconque des revendications 1 à 6, dans lequel la sortie du générateur à courant alternatif subit un redressement demi-onde par une diode (D12). 10
9. Circuit selon l'une quelconque des revendications 1 à 6, dans lequel la sortie du générateur à courant alternatif subit un redressement demi-onde par un transistor (28). 20
10. Circuit selon l'une quelconque des revendications 1 à 6, dans lequel la sortie du générateur à courant alternatif (1) subit un redressement pleine-onde par un redresseur pleine-onde, la sortie du redresseur étant alimentée vers une autre diode (D13) avant de charger le condensateur (C2). 25
11. Circuit selon l'une quelconque des revendications précédentes, dans lequel un circuit amortisseur (D6, ZD2, R2) est connecté en parallèle à travers l'électro-aimant (4). 30
12. Circuit selon l'une quelconque des revendications précédentes, dans lequel l'élément de commutation (5) comprend un transistor. 35
13. Circuit selon l'une quelconque des revendications précédentes, dans lequel la sortie du générateur à courant alternatif est fournie par une pluralité de bobines auxiliaires (12) connectées en série. 40
14. Circuit selon la revendication 13, dans lequel chacune des bobines auxiliaires (12) est disposée sensiblement à 90 degrés par rapport aux bobines auxiliaires adjacentes. 45
15. Circuit selon l'une quelconque des revendications précédentes, dans lequel la/les bobine(s) auxiliaire(s) (12) agit/agissent aussi comme une source d'énergie pour d'autres composants, tels que des lampes et/ou un klaxon. 50
16. Moteur à deux temps comprenant une pompe à lubrifiant incluant un électro-aimant (4), et un circuit de contrôle selon l'une quelconque des revendications précédentes pour contrôler le fonctionnement 55

de la pompe.

17. Moteur selon la revendication 16, dans lequel le générateur à courant alternatif comprend en outre une bobine d'allumage (14) qui agit comme une source d'énergie à haute tension pour l'allumage du moteur.
18. Moteur selon la revendication 16 ou 17, dans lequel le générateur à courant alternatif comprend en outre une bobine exploratrice (13) pour temporiser l'allumage du moteur.

Fig. 1

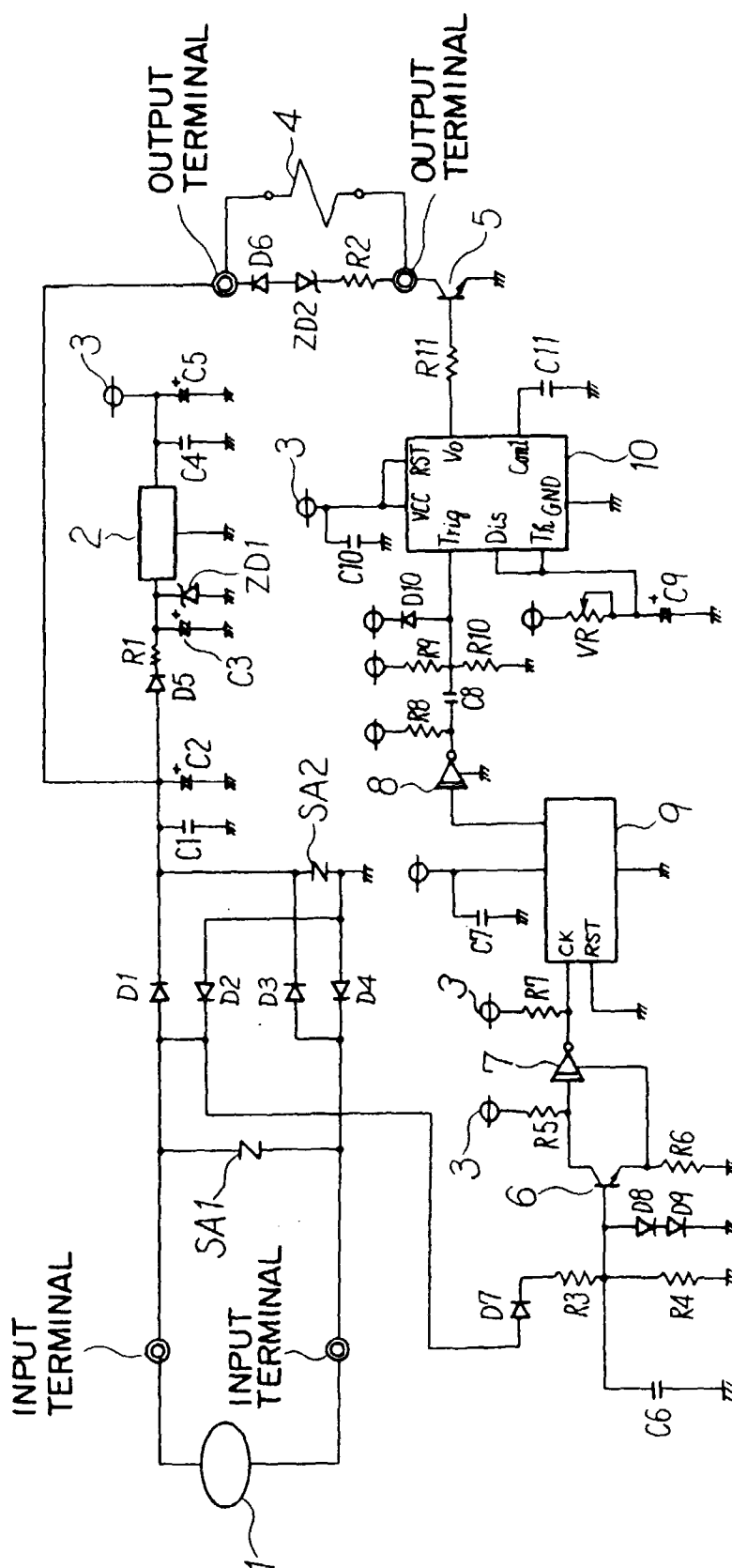


FIG. 2

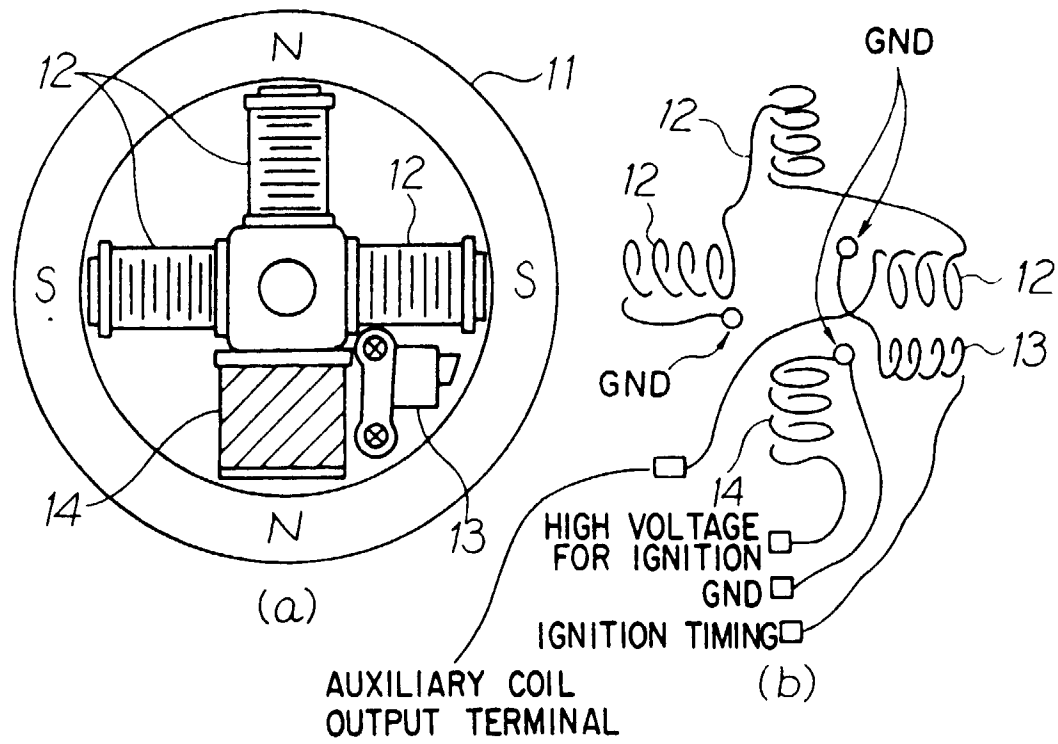


FIG. 3

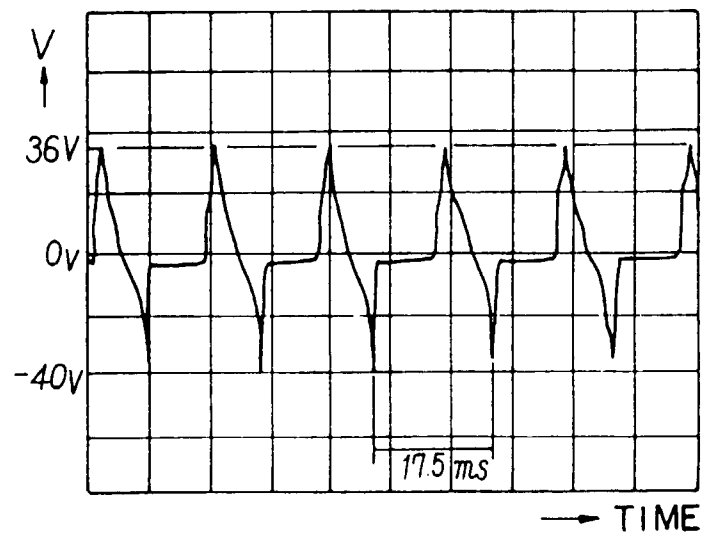


FIG. 4

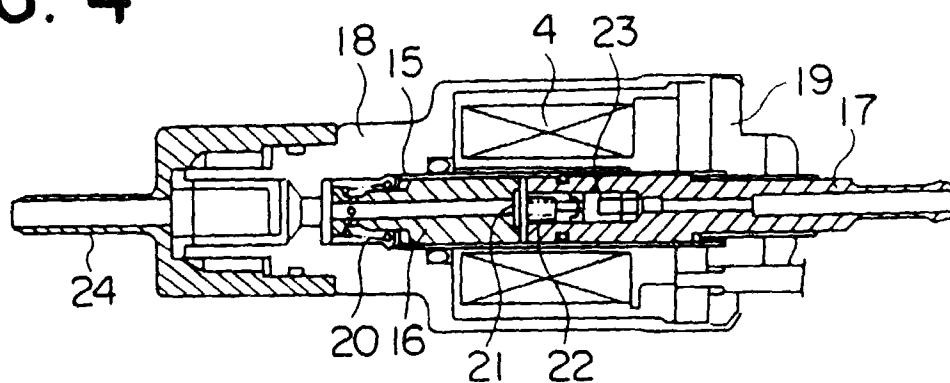


FIG. 5

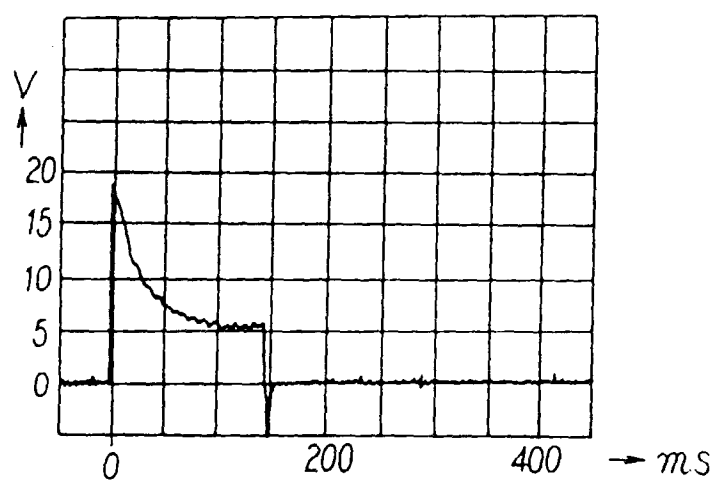


FIG. 6

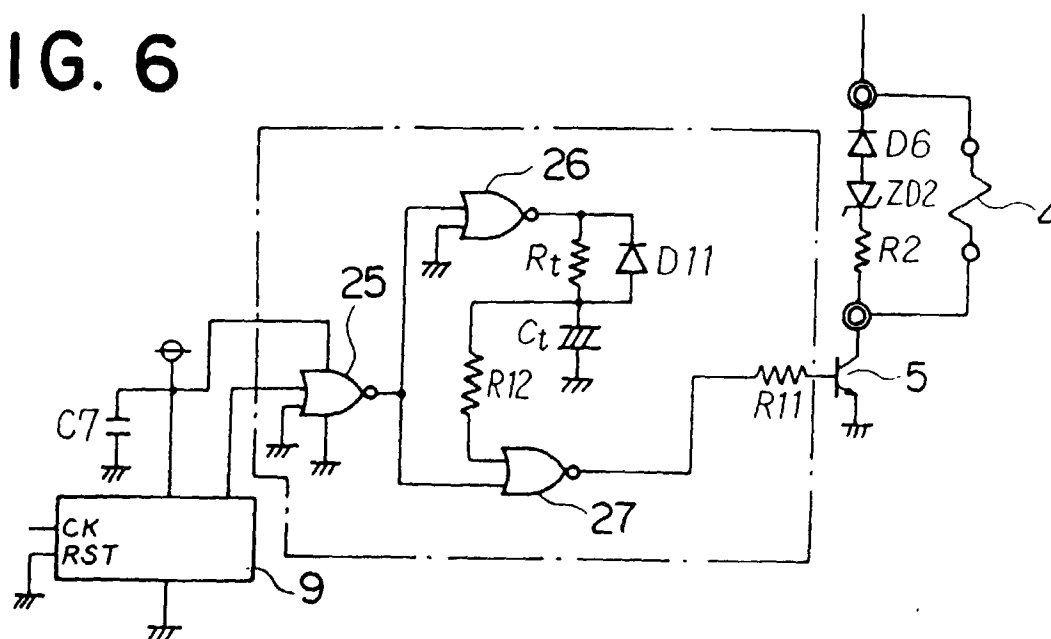


FIG. 7

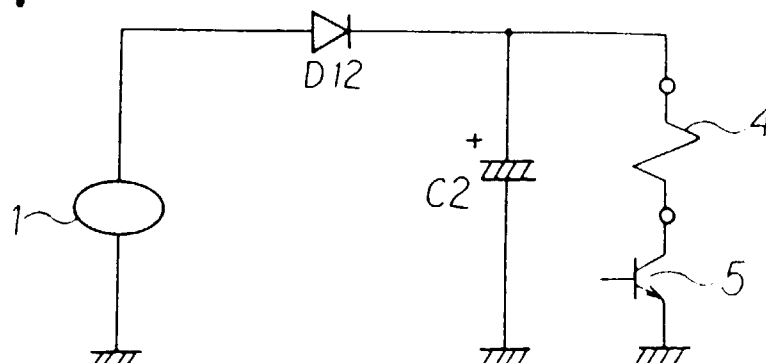


FIG. 8

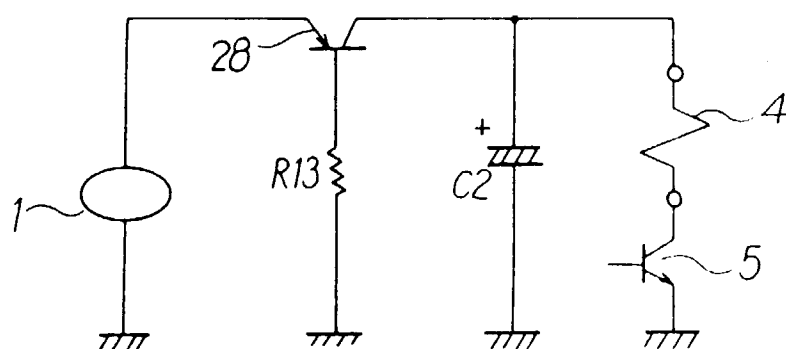


FIG. 9

