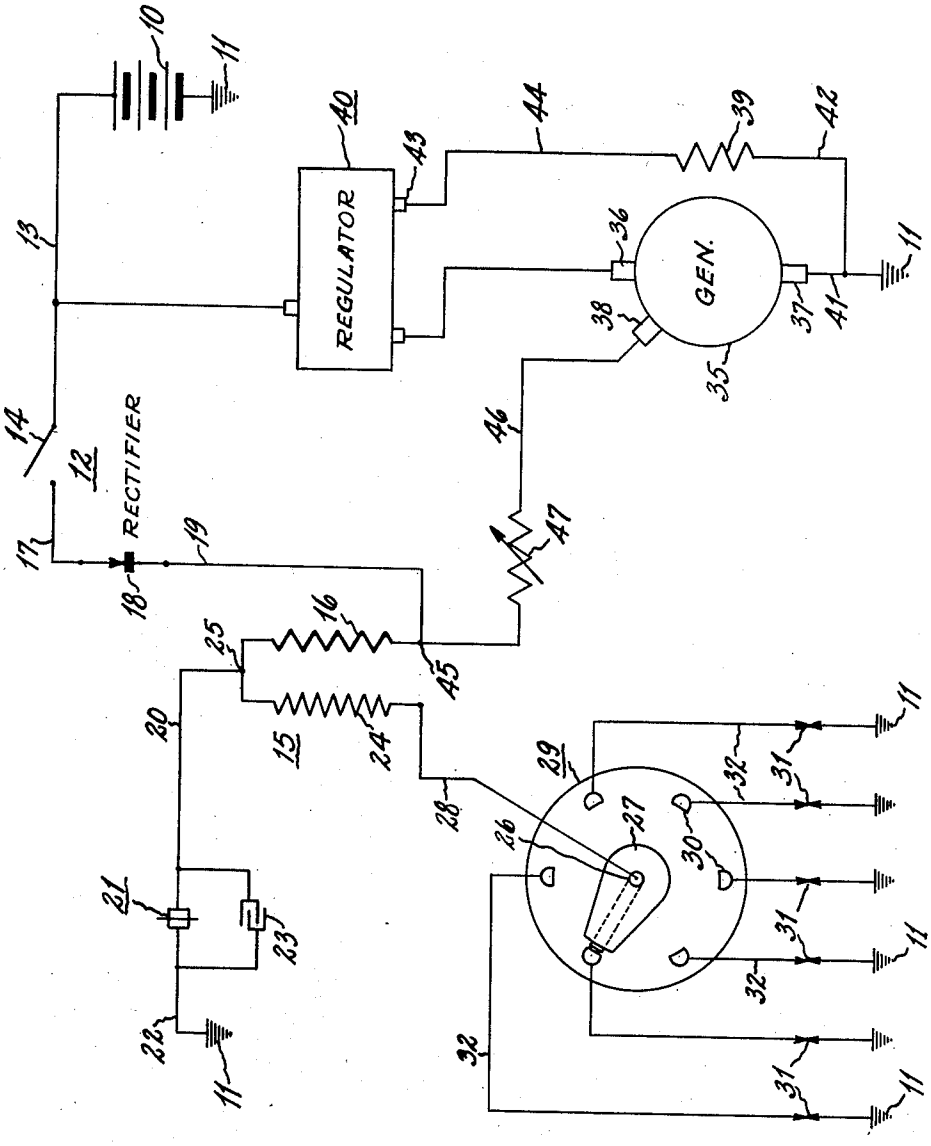
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IGNITION SYSTEM

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IGNITION SYSTEM

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This invention relates to an ignition system for internal combustion engines and more particularly for automotive use.

It is an object of the present invention to provide an ignition system switch as will provide satisfactory ignition for an engine operating under relative high compression. In the disclosed embodiment of the present invention this object is accomplished by the use of a battery and a generator, said generator having main and auxiliary brushes for supplying current for the ignition circuit and by having a variable resistance in circuit with the auxiliary brush and through which current is supplied to the coil and timer, said resistance under some operating conditions causing the generator to supply current to the ignition circuit at a voltage substantially greater than the battery voltage. The current produced by the higher voltage is prevented from passing to the battery by a unidirectional electric valve interposed between the battery and the resistance.

Further objects and advantages of the present invention will be apparent from the following description reference being had to the accompanying drawings wherein a preferred embodiment of the present invention is clearly shown.

In the drawing:

The drawing is a wiring diagram illustrating a form of the present invention.

Referring to the drawing the ignition circuits of the present invention are illustrated in the drawing. One of the ignition circuits includes a battery 10, one terminal of which is grounded to the vehicle frame 11. The other terminal of the battery is electrically connected to one stationary contact of an ignition switch 12 by a lead wire 13. The other stationary contact of switch 12, adapted to be bridged by a movable contact 14, is connected to one end of a primary winding 16 of an ignition coil 15 by a rectifier or a unidirectional electric valve 18 and a lead 19. The other end of the primary winding is connected by a lead 20 to one of the contacts of a timer 21. The other contact of the timer is connected to ground by a lead 22. The contacts of the timer are bridged in the usual manner by a condenser 23. One end of the secondary winding 24 of the ignition coil 15 is connected with the primary winding 16 at the point 25 while the other end of the secondary winding 24 is connected to a conductor 26 of a rotor 27 of a conventional distributor 29 by a lead 28. The distributor is provided with a plurality of terminal posts 30 each of which is connected to a spark plug 31 mounted in the

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engine. As illustrated, each spark plug 31 has one side grounded while the other side of each spark plug is connected to the proper distributor terminal post 30 by a lead 32.

The ignition circuit illustrated in the drawing is also furnished with current by a generator 35 which is provided with main brushes 36 and 37 and an auxiliary or third brush 38. The generator is provided with a field 39. The main brush 36 is connected with one terminal of the battery by a regulator 40 and the other main brush 37 is connected with ground by a lead 41. The field 39 has one end connected with the brush 37 by a lead 42 while the other end of the field is connected to a terminal 43 of the regulator 40 by a lead 44.

The regulator 40 consists of two units, not shown, but well known in the art. The regulator 40 in this instance includes a cut-out relay and a voltage and current regulator. The cut-out relay closes the generator-to-battery when voltage is sufficient to charge the battery and it opens the circuit when the generator voltage falls below a certain value. The voltage regulator is a voltage limiting device that prevents the voltage from exceeding a specified maximum and reduces generator output to the value required for any particular condition of battery charge and the current regulator.

As shown in the drawing the generator includes the auxiliary brush 38 which is connected in parallel with the primary winding at point 45 by a lead 46. In series with the auxiliary brush is a variable resistance 47 which is current compensated. In terms of function, this means that the higher the voltage the higher the current and greater the current the greater the resistance. Since the resistance increases greatly with current the resistance unit is adjusted to prevent an excess flow of current through the primary circuit which is slightly below the peak current permissible for the breaker contacts 21.

The operation of the present invention is as follows: When ignition switch 12 is closed and the generator is at rest or operating at low speed, the primary current is furnished from the battery 10 and flows through lead 13, ignition switch 12, lead 17, rectifier 18, lead 19, primary winding 16, lead 20 contact points 21 and back to the battery 10 through ground. The cutout relay, associated with the regulator designated by reference numeral 40 automatically connects the generator 35 with the battery 10 when the voltage drops below a certain value and disconnects the battery when the voltage exceeds a certain value. In the pres-

ent instance, the generator is a 6-volt generator with the third or auxiliary brush 38 that is positioned in such a manner to furnish voltage between the ground and the third brush which varies with generator speed. It has been found that voltage will build up from 0 to 20 volts at 3000 R. P. M., depending on the size of the generator, the output, and the position of the third brush. The third brush can be adjusted accordingly to the voltage requirements.

As soon as the generator voltage builds up sufficiently so that the voltage is greater than that furnished by the battery, the current for the ignition system will be furnished from the generator. When this occurs the rectifier 18 will prevent passage of current from the third brush to the battery and thus prevent injury to the battery.

The particular advantages of the present ignition system is that at high speeds the secondary voltage will not drop off as is common with the 6-volt system, due to the fact that the primary voltage will be obtained from the generator third brush. It is also pointed out that should the fan belt break or the generator fail, the 6-volt battery will be adequate to furnish ignition so that the operator can drive his car to a service station and have the generator repaired. Another advantage of the present invention is that it overcomes the disadvantages of a 12-volt ignition system in that all of the component parts, such as the battery, a meter, the regulator, generator, starting motor, solenoid switch and so forth, would not have to be changed or replaced to compensate for the higher voltage.

While the embodiment of the present invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted.

What is claimed is as follows:

1. An ignition system for internal combustion engines having an ignition coil, an ignition timer, a battery and a generator; a circuit connecting said battery and generator with said coil and timer including a manually operated switch for controlling said circuit, said generator having main and auxiliary brushes for supplying current to said circuit; a variable resistance in circuit with the auxiliary brush and through which current is supplied to said coil and timer, said resistance under some operating conditions causing the generator to supply current to the ignition circuit at a voltage substantially greater than the battery voltage; and means interposed between the battery and said resistance to prevent said higher voltage from leading back to the battery.

2. An ignition system for internal combustion engines including an ignition coil; an ignition circuit including a timer and a battery; switch means for connecting the battery with the ignition circuit; a generator for charging the battery and supplying current to the ignition circuit, said generator having main and auxiliary brushes; a variable resistance connected with the auxiliary brush and the ignition circuit which under some operating conditions causes the generator to supply current to the ignition circuit at a voltage substantially higher than that obtainable from the battery; and means connected in the ignition circuit permitting passage of current in the ignition circuit in a single direction.

3. An ignition system for internal combustion engines including an ignition coil; an ignition circuit including a timer and a battery; a manually operated switch for directly connecting the battery with the ignition circuit; a generator for charging the battery and supplying current to the ignition circuit, said generator having main and auxiliary brushes; a variable resistance connected between the auxiliary brush and said ignition coil which under some operating conditions causes the generator to supply current to the ignition circuit at a voltage substantially greater than the battery voltage; and means interposed between the battery and ignition coil to prevent the higher voltage from leading back to the battery.

4. An ignition system for internal combustion engines having an ignition coil, an ignition circuit including a timer and a battery; a manually operated switch for connecting the battery with the ignition circuit; a generator for charging the battery and also supplying current to the ignition circuit, said generator having an auxiliary brush and main brushes; means connected between the auxiliary brush and the coil capable of impressing upon the ignition circuit a higher voltage under certain operating conditions of the generator than is obtainable from the battery; an a unidirectional electric valve connected in the ignition circuit, said valve allowing current to pass from the battery to the ignition circuit during closure of the switch but preventing current from passing to the battery in the reverse direction.

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No references cited.