

NEW IDEAS

Automobile ignition substitute

HERE'S A DEVICE THAT CAN HELP YOU find out what's wrong when suddenly one morning your car refuses to start. The ignition substitute described here can even be used to verify that repair work done to your engine by someone else has been done correctly.

Basically, the ignition substitute provides a constant power-source for the ignition coil. Its frequency (0.5-1.0 kHz) is that used by an 8-cylinder engine with an idling speed of 650 RPM, and the unit provides a rapid spark at a 17% duty cycle, while nonetheless staying within the power-dissipation limits of the components.

Construction is straightforward, and any method can be used. The circuit, shown in Fig. 1, consists of a 555 timer IC configured as an astable free-running multivibrator that is used to drive a high-current NPN transistor, such as a 2N6384. (That transistor should be heavily heat-sunk because it may be drawing several amps over quite a long period of time.)

The coil ballast can be from 0.68 to 6.5 ohms, depending on what's available. The 2.5-ohm, 20-watt ballast shown in Fig. 1 works well. All the other resistors can be either ¼- or ½-watt devices, and the capacitor between pins 1 and 5 of the 555 can range from 0.01 to 0.05 µF. Do not omit the 100-volt, 0.05 µF capacitor across the transistor; it prevents voltage spikes from damaging the device. Use 4-foot-long clip leads to obtain power directly from the automobile's battery; that length is suggested for convenience.

You can use either your car's own

ignition coil, or a separate one. If you choose the latter, be sure to disconnect the one in the vehicle. A good coil will produce a spark between the high-tension lead and ground about ¼- to ½-inch long, and a strong bright spark across a plug with a gap smaller than 0.040-inch. That, by the way, is the first test for ignition problems.

To determine whether there's a problem with the car's distributor, supply a spark derived from the ignition substitute to the center distributor lead leading to the rotor and slowly rotate the distributor cap. Crank the engine and, at some point, the engine should catch and run. If the engine cannot be started, but seems to be trying to, the problem is probably in the timing chain, valves, camshaft, or elsewhere. If the engine doesn't even try to start, inspect the rotor, cap, wires, and plugs for damage. Once the ignition problem has been found and corrected, the normal procedure for setting the timing and dwell should be followed.

Do not attempt to adjust the distributor using the ignition substitute. That can not be done because the spark the substitute produces is slightly different from that produced under normal conditions.

Although designed for an 8-cylinder engine, this device can be used with other types. In addition, a neon bulb can be added to the circuit to verify the presence of a spark, and, in fact, can be used as a timing light if placed close to timing marks that have been painted white with fingernail polish.

—Stan K. Stephenson II

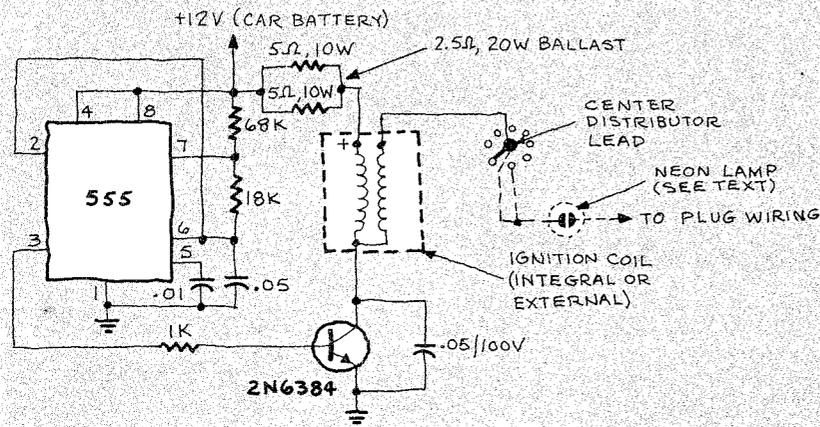
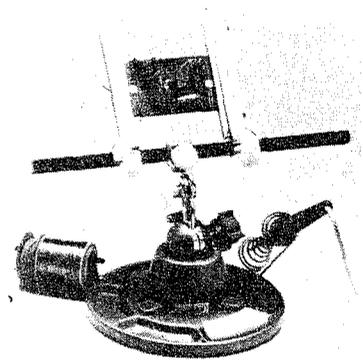


FIG. 1

NEW IDEAS

This column is devoted to new ideas, circuits, device applications, construction techniques, helpful hints, etc.

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