Engine staller thwarts car thieves

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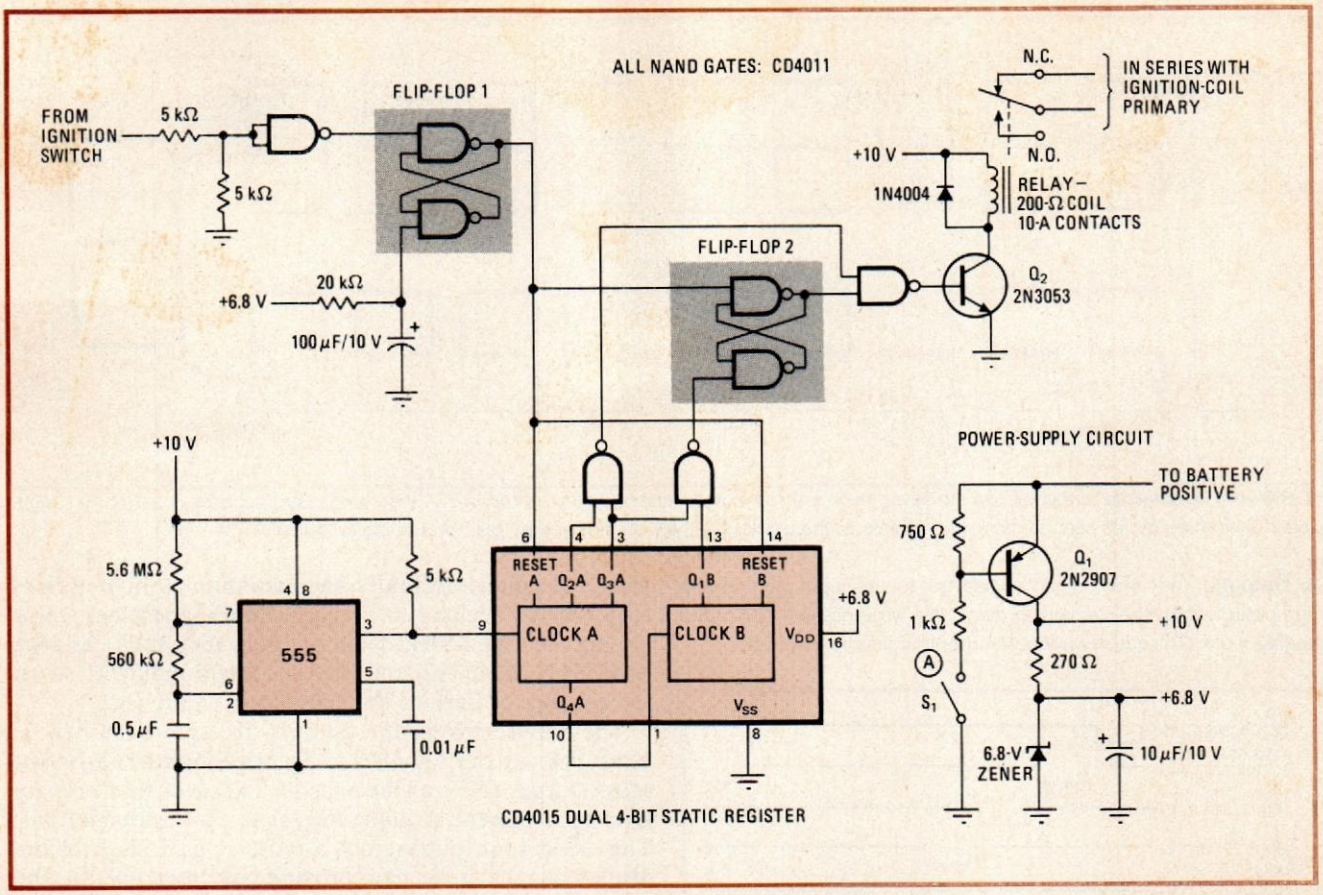
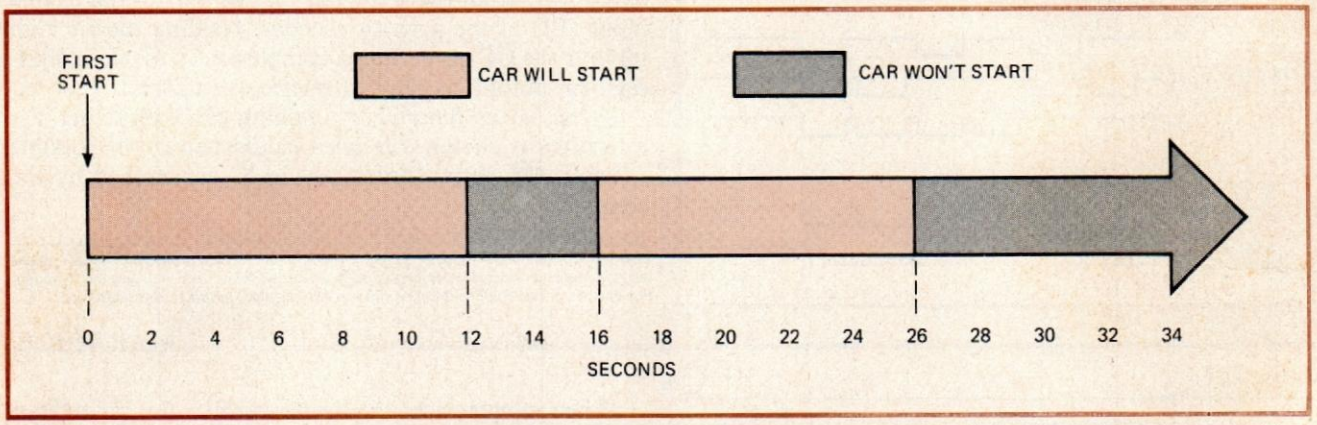
Car thieves are becoming surprisingly astute at finding and disabling theft-prevention devices in automobiles. But what if the vehicle starts and then stalls repeatedly? Chances are the would-be thief won't suspect an anti-theft device but will instead hunt for a new victim, if the car is equipped with a unit that simulates engine malfunction.

When in operation, the device permits the car to start normally and after 12 seconds opens the circuit to the ignition coil, stalling the engine. Four seconds later, the circuit again closes, enabling the thief to restart the engine. The cycle repeats and then after an additional 12 seconds, the engine stalls, and will not start again. By this time, the thief will probably abandon the car a short distance at most from where it was parked.

The circuit of the anti-theft device, shown in Fig. 1, makes use of a 555 timer and complementary-metal-oxide-semiconductor logic for low battery drain. Enable switch, S_1, which should be concealed, is set by the driver to activate the circuit whenever he leaves his car. A good way for a nonsmoker to conceal S_1 is to use the cigarette lighter—its wire to the battery is simply disconnected and routed to the circuit at point A. A key switch may be



1. No escape. Although a car thief can start a vehicle equipped with this circuit, he soon gets discouraged when the engine stalls repeatedly. Timer circuit periodically removes power from the ignition coil, simulating engine malfunction.



2. Timing. The start-stop cycles for the anti-theft device are 12 seconds and 4 seconds, respectively. After the engine stalls the third time, it can not be restarted until the driver opens the enable switch S_1, which is concealed within the car's interior.

placed in series with S_1 to safeguard against tampering.

Once the circuit is armed by closing S_1, turning on the car's ignition toggles flip-flop 1, made up of two NAND gates, permitting 0.5-hertz pulses from the 555 timer to enter the CD4015 shift register. The CD4015 contains two 4-bit shift registers, which, in this case, are cascaded. After 12 seconds (six pulses) the NAND gating turns on transistor Q_2, opening the normally closed contacts of the relay and stalling the engine. After two more timer pulses enter the shift register, the NAND gating turns off Q_2, enabling engine to be restarted. The cycle is repeated, except that the third application of ignition voltage toggles flip-flop 2, and the car can not be started again until the driver returns and opens S_1. The timing sequence is detailed in Fig. 2.

To make device unrecognizable as an anti-theft unit, it can be built on a small circuit board and housed in a small box such as those used for pollution controls.

An optional alarm that actuates after 60 seconds can be added by connecting pins 5 and 12 of the shift register to an additional two-input NAND gate. The gate output can be made to drive a relay activating the horn, lights, or a siren to draw attention to the abandoned vehicle, if desired. □