The Cut-Out

by Tom Endy

The Model A Ford generator cut-out is the mysterious little device that sits on top of the generator. There is a switch inside that is either open or closed. Its very simple purpose is to connect and disconnect the generator from the battery and the rest of the electrical circuit. In the days before there were generator regulator circuits the cut-out was a means to connect the generator to the car's electrical circuit when the engine was running, and disconnect it when the engine was not running.



Original quality Ford cut-out on the left. Insides of a poor-quality reproduction on the right

When the generator is not rotating and producing electrical power its stopped condition would be a drain on the battery. Therefore the cut-out switch is commanded to open.

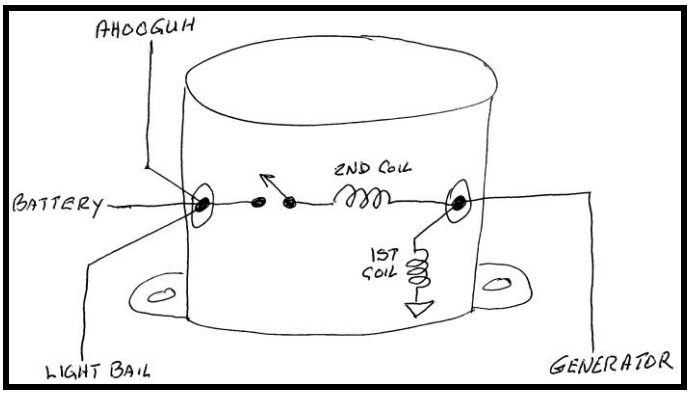
When the generator is rotating and producing electrical power the desire is to have the generator connected to the car's battery and electrical system. It then carries the load of any electrical device that is switched on and it also charges the battery. Therefore the cut-out switch is commanded closed.

How it does this is where the mystery comes in. Anytime you pass current through a coil of wires it creates magnetism and magnetism is what opens and closes the switch. Inside the cut-out housing, in addition to the switch, are two coils of wire. The two coils open and close the switch much like a relay operates.

The switch contacts inside the cut-out are normally open. The first coil has a very fine gauge wire and is connected in parallel with the generator. As soon as the generator starts rotating it begins to produce voltage and current flows through the coil. The faster the generator rotates the higher the voltage level rises. When it reaches a set point above the battery voltage (a nominal 7 volts) the magnetism in the coil is strong enough to close the switch. The generator is then connected to the car's battery and electrical system.

The second coil has a very heavy gauge wire and is connected in series with the generator. The coil wire has to be heavy because all the current produced by the generator flows through this series coil. It too produces magnetism that is in concert with the first coil. The combined magnetism of the two coils keeps the switch closed.

When the engine speed returns to idle or is turned off and the generator slows or stops it is no longer producing voltage. The battery then takes over the load and current through the series coil is reversed. The magnetism of this coil is also reversed and is stronger than the parallel coil and it cancels it out and opens the switch.



Cut-out electrical circuit