THE MODEL A TOOLBOX

MODEL A GENERATOR CUT-OUT

by Colin Lawson

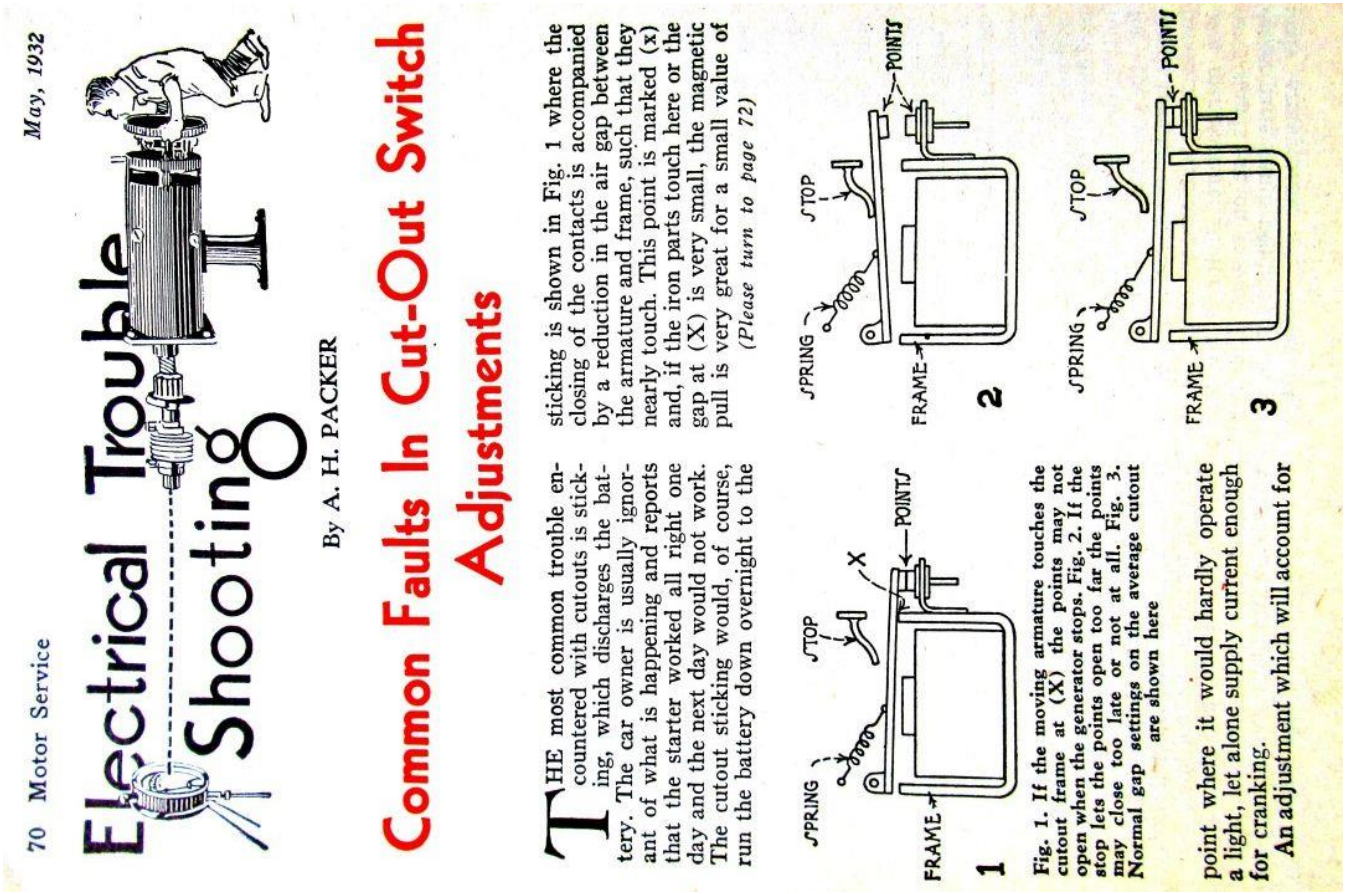
The generator charges the battery while the engine is running. When the battery voltage is lower than the generator output, the cut-out switch (mounted in the generator) closes to complete the charge circuit. When the engine is off, the cut-out opens to isolate the battery from the generator.

For the cylindrical type generator the charging rate is set by moving the centre brush which may be required if driving with lights on for an extended period of time. Typical charging rate for daytime driving is about 4 amps.

Modern charging controls include installation of a high current diode within the cut-out to replace the relay contacts; or using an alternator modified for 6 volt positive ground.

Extensive information about the cut-out can be found at
http://modelabasics.com/Cutout.htm

The following article on the cut-out switch is generic but relates to the type used in the Model A. The cut-out is usually reliable but this article is intended to educate the mechanic on possible causes of failure and how to make adjustments and for testing. It was included in the May 15 1932 issue of Motor Service Magazine containing equipment advertising and useful service articles for service businesses and mechanics.



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Electrical Trouble Shooting

By A. H. PACKER

Common Faults In Cut-Out Switch Adjustments

THE most common trouble encountered with cutouts is sticking, which discharges the battery. The car owner is usually ignorant of what is happening and reports that the starter worked all right one day and the next day would not work. The cutout sticking would, of course, run the battery down overnight to the sticking is shown in Fig. 1 where the closing of the contacts is accompanied by a reduction in the air gap between the armature and frame, such that they nearly touch. This point is marked (x) and, if the iron parts touch here or the gap at (X) is very small, the magnetic pull is very great for a small value of

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SPRING STOP X POINTS FRAME 1

SPRING STOP POINTS FRAME 2

SPRING STOP POINTS FRAME 3

Fig. 1. If the moving armature touches the cutout frame at (X) the points may not open when the generator stops. Fig. 2. If the stop lets the points open too far the points may close too late or not at all. Fig. 3. Normal gap settings on the average cutout are shown here

point where it would hardly operate a light, let alone supply current enough for cranking.

An adjustment which will account for

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current in the shunt coil. It also means that, with the points closed and the shunt coil connected to 6 volts, even a discharge current of 15 amperes may be unable to weaken the magnetism enough to let the spring open the contacts. The enormous magnetic attraction when the iron parts touch, as compared with the moderate pull when a slight gap exists, can be tested with an ordinary magneto magnet. Just hold a piece of iron near it and see how, as the gap is reduced, a point is reached where the magnet suddenly draws the iron piece against its poles.

The remedy is to change the adjustment so that the contact points touch while the magnetic air gap is still about 1/32 inch, the exact way of accomplishing this result depending on the cut-out construction.

Cutout Closes Late

Another cutout trouble is one that prevents the generator charging the battery at low car speeds and it may be

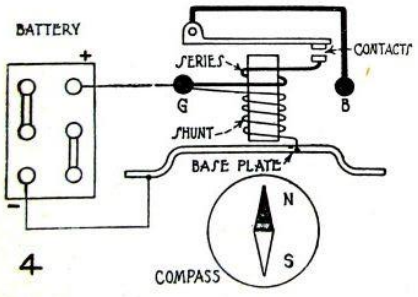

Fig. 4. Checking magnetic action of shunt coil with a 6 volt battery

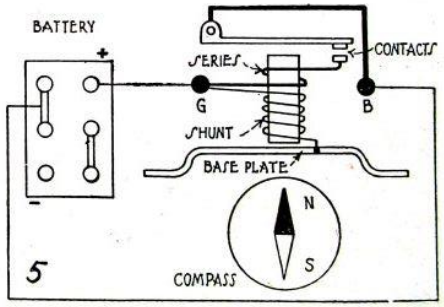

Fig. 5. Checking magnetic action of series coil with one cell of a 6 volt battery

necessary to run the car at 20 M.P.M. or so before charging takes place. Then the ammeter hand may suddenly jump up to 6 or 8 amperes charge. This means either that the spring is too stiff or the magnetic gap too great. If the cutout releases properly it shows the spring to be about right and the setting which is to blame may be like the one illustrated in Fig. 2. All cutouts have a stop of some sort to limit the opening of the points, and, in Fig. 2 the stop is shown bent up too much so that the points open too far. This means that a voltage of 10 or 12 may be needed at the shunt coil to make the magnetism strong enough to operate across the wide air gap. The remedy is obviously the bending of the stop so that the air gap is less.

A setting which is normal on the average cutout is shown in Fig. 3 where the air gap is about 1/32 inch and when the points open they are separated by a space of about 1/32 inch. These figures will not, of course, guarantee results but slight variations from these dimensions may be needed in specific cases.

Trouble Caused by a Reversed Winding

Now and then you run across a defective cut-out switch in which the series winding is wound in the wrong direction as compared to the shunt winding. While this is a rare occurrence it is nevertheless very puzzling unless you know the symptoms. When the cutout points are closed and the genera-

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tor starts to charge the battery, the charging current will make the points open. Then they will close again and then open causing a fluttering action and a sparking which rapidly burns the contacts. On the other hand when the engine stops, the generator discharge current will hold the points together so that you can hardly get them open.

It is possible to check for this condition with a compass, by using current from a battery.

In Fig. 4 we have positive battery connected to the generator terminal, with the negative battery connected to the base plate, so that the battery will act much as the generator would do. We will then assume that, with the cutout laid on its side, the north end of the compass is attracted by the lower end of the cutout core.

When the generator charges the battery it sends current two ways from the Gen. terminal. One way is through the shunt coil and the other way is through the series coil and the points to battery, and these two currents are both supposed to hold the points together. Therefore they should have the same effect on the compass.

Checking the Series Coil for Magnetic Effect

In Fig. 5 we connect to send current through the series coil and because the resistance of this circuit is very small only one cell or two volts of the battery should be used. Even so the current will be perhaps 30 amperes or more and in this test it would be well to use a fairly long piece of wire to get some resistance in the circuit. With this current flowing the action of the compass would be the same as before, the same end of the needle being attracted.

In this test the same end of the battery must be kept connected to the Gen. terminal so that no mistake in judging results will be made.

Only one thing has been difficult to test without a generator, and that is the way the cutout points open, although a 4-volt test is a fair check on the operation. We could of course imitate the generator action by connecting the shunt coil to a six-volt battery and at the same time we could connect another battery and a rheostat in such a way as to send a bucking current through the series coil and points. At some value of the bucking battery current the points should let go, but here we would have a difference in the generator action and the battery imitation.

When the points of the cutout start to open with the battery test we would still have full six volts on the shunt coil and a vibrating action might result. With actual operation with the generator, however, the instant the points open and the generator and battery become disconnected, the generator voltage, which is actuating the shunt coil, immediately drops, so that the shunt coil is weakened and cannot close the points until the generator speeds up again.

This test, however, is not very vital if the cutout is one of reliable make for we can assume that it is built substantially right and, if we have tested if for direction of coil winding and for cutting in and out on various shunt coil voltages, there is but a very remote chance of its giving trouble.