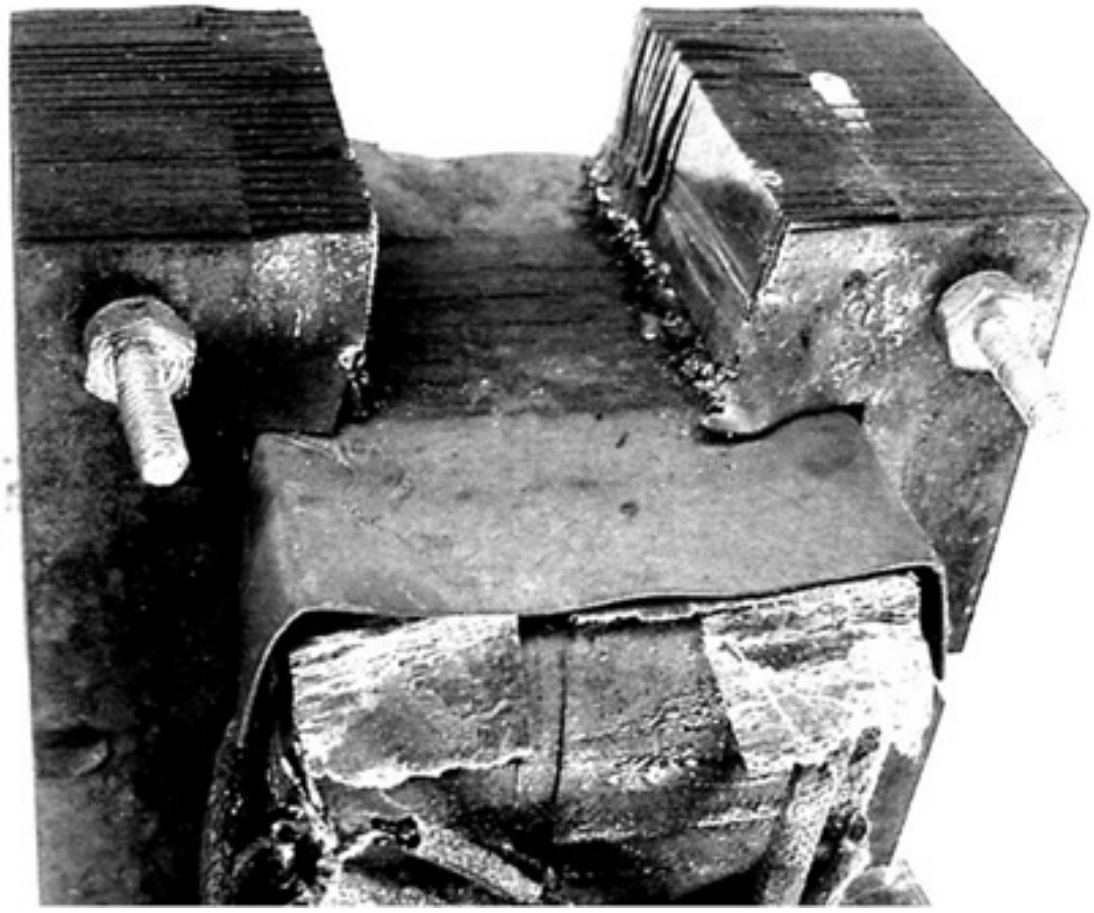
Poor Man's Magnet Charger

by Tom Carnegie

Many of the readers of this article have likely charged their model T magnets in one way or another. One common way is to use the magneto field coil to charge the entire magnet set at once. This can be done with the magnets in the car. If you desire the ability to charge the flywheel magnets individually it can be accomplished with parts salvaged or purchased cheaply.

What you need:
Transformer - the one I used was from an old television set. I think a microwave oven transformer would work well. They are easily obtained. The bigger, the better. Bridge rectifier - buy the highest amperage rated one for at least 120 volts that you can get.



Radio Shack Part no. 276-1181 is 6 amp 200 volt unit, which should be adequate, although bigger and better ones are available on E-Bay.

5 amp fuse and holder.
Switch,
Power, cord
Hot plate.

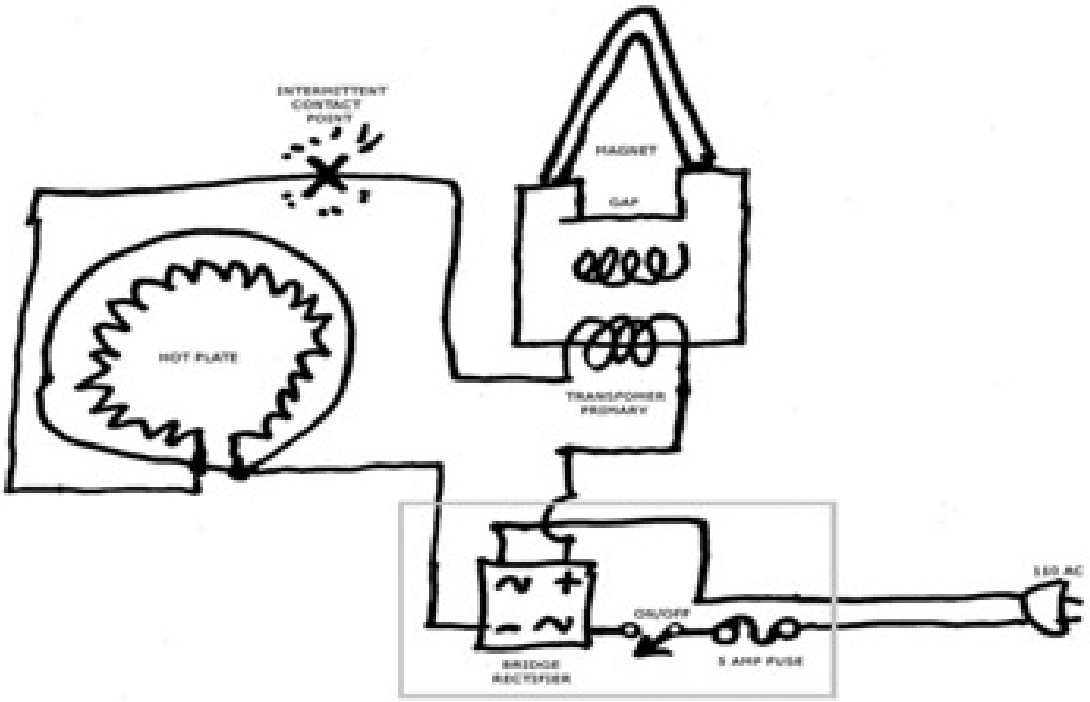
There are essentially three parts to this set-up. One: the electromagnet, Two: the rectifier and Three: the current limiter. We will use the 110-volt primary windings of the transformer

to make our magnet. The 110-volt primary windings are the ones that the power cable originally attached to. A transformer does not make a good electromagnet without being modified. You will need to cut a notch out of the transformer to make a north and south pole. (see picture) I just hacked it out with a hacksaw. The electromagnet needs to have a steady north and south pole. If the electromagnet were powered by house current the north and south poles. would be alternating sixty times per second. To make the poles constant requires direct current. This is done with a rectifier.

On the schematic there is a box drawn around the rectifier section of the circuit. I mounted my rectifier into a hobby box from Radio Shack. (see picture) My rectifier is actually two rectifiers in one. For this project we only need one. The DC coming out of this circuit is substantial, so care should be taken when working around it. It is around 90 volts and the amperage is limited by the size of the rectifier and fuse.

The amount of magnetism produced by an electromagnet is a function of current and the number of turns of wire. This is known as "amp-turns". To a certain degree it is also affected by how well the wire is wound onto the iron transformer core. This is called the "Q" factor. "Q" stands for quality. There are many turns of wire in a transformer such as we are using for our charger. This is good and bad. It is good because more turns mean more magnetism. It is bad because it is harder to shove current through small wire and current is half of the amp-turn picture.

As it turns out we have plenty of current to fill our transformer core. At a certain current level the transformer core will become saturated with magnetism. When the current reaches this level, any added current will be wasted and dissipated as heat. A direct connection from the rectifier to the electromagnet would likely exceed this current level so the current is passed through a hot plate, or some other resistive load to limit the current through the windings of the transformer. The hot plate I used was about 1000 watts.



The "X" on the schematic denotes a break point in the circuit where the DC to the transformer is made and broken. To charge a magnet does not require a steady shot of

current. Brief pulses are better as they will tend to hammer the magnetic "domains" into alignment. A momentary contact switch would work well for this, although I just sparked the two wires together. Traditionally if a model T magnet is able to pick up a cast iron T piston which weighs about two pounds, it is said to be sufficiently charged. A typical model T magnet will do this if it has around 650 gauss of magnetism. This varies some from magnet to magnet. This charger setup should charge a T magnet into the 800 or 900 gauss range. I will present a separate article on how to make a gauss meter.