Jim's Haunt - Pics & Stuff

Jim's Jumpin Jack

(updated 2/11/05)

Description:

Here is a idea* for a low voltage sparking device that should operate continuously. It's an old idea, so I've got no real right to put my name on it. A coil of wire that jumps around as the end of the coil is pulled up and down, making and breaking the circuit with sparks and arcs on each bounce.

Main Parts Needed:

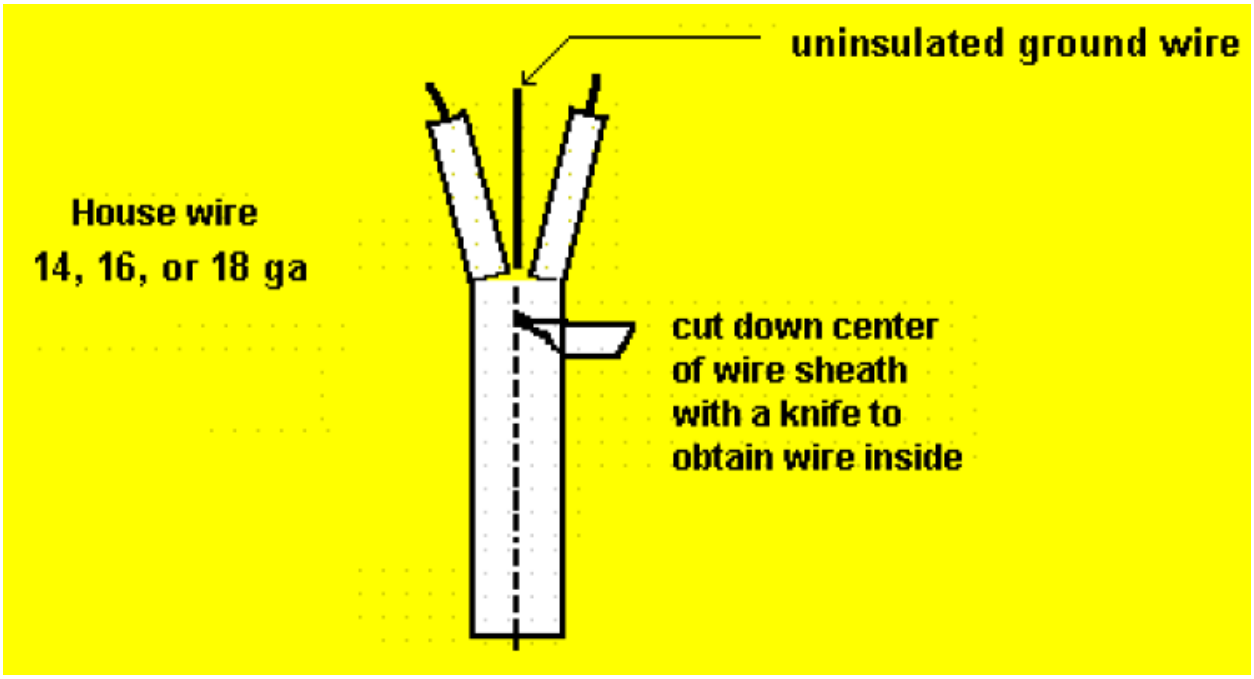
1) 12 volt - Auto or Tractor Battery
2) 25 foot of from 14 to 18 gauge standard copper house wire
   (minimum household wire length you can purchase)
3) Battery charger - to re-charge battery after use
5) In-Line fuseholder and some 15 0r 20 amp "cartridge type" auto fuses to fit
6) A steel plate - use scrap metal any thickness, need 4" inches square or larger
7) Various tools and electrical tape

* Note: Originally the liquid metal, mercury, was used in place of the metal plate. However as mercury fumes are poisonous this is not done anymore. A problem with the metal plate is that the end of the copper coil that bounces around is easily melted by the spark. Thus the coil's wire end may "spot weld" itself to the metal plate. This will electrically create a short circuit which will blow the fuse. It's wise to at least grind the end of the copper wire coil to a point. Even better is to remove the plastic outer covering from a wire nut and twist the wire nut's inner metal core onto the tip of the wire coil. This metal tip won't melt as easily as the copper wire.

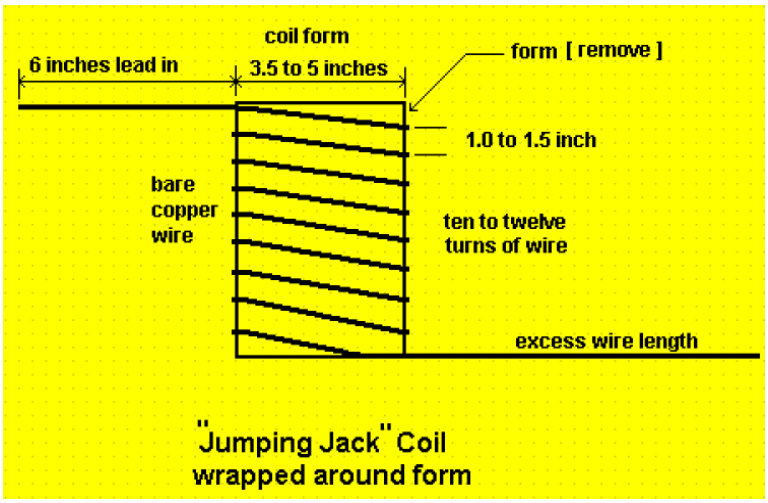
Obtained from
Omarshauntedtrail.com

Construction

Step 1: With a knife carefully slit the sheath of the house hold wire down the middle and pull out the black and white insulated wires inside. You'll need at least 15 feet of sheath removed , and you can use the ground wire which is un-insulated, for making the coil.

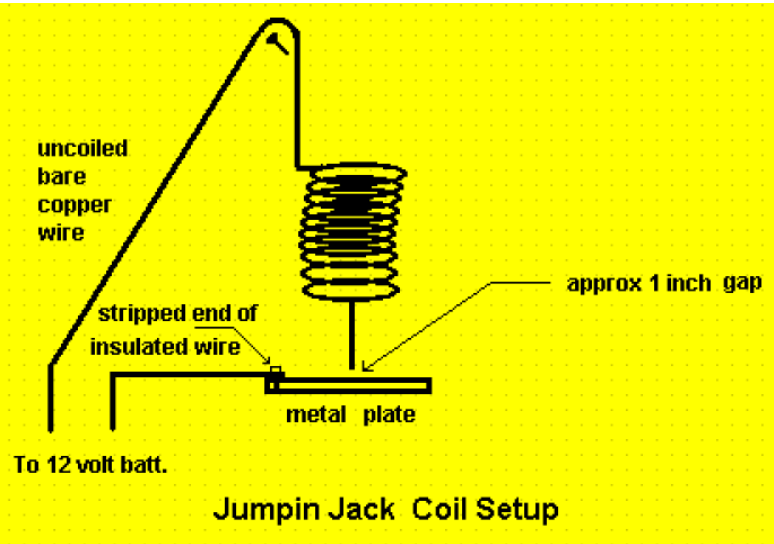


Step 2: Next find anything convenient that is cylindrical, long enough, and from 3.5 inch to 5 inch in diameter (a 4" diam piece of PVC works well). This will be the form to wrap your coil. You'll want at least a foot (12") of coil length; start with about 6 inches of straight wire before you begin bending around the form and don't wrap closely there should be (after the "form" is removed) an inch (1") or so between wraps in the "jumping coil" - ref. diagram below. When completed, remove the form and you should have a free standing "spring like" coil

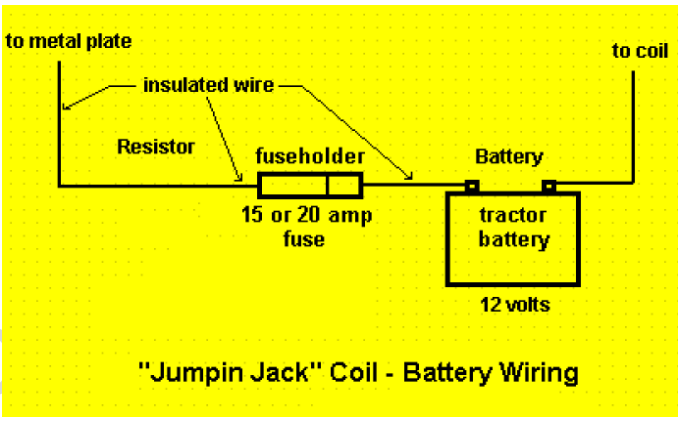


Omarshauntedtrail.com

Step 3: At the one end, bend the 6 inch lead parallel to the axis of the coil. (i.e. at right angles to the direction it appears in the diagram above). At the other end, bend the excess wire so that it too comes off the coil parallel to the axis of the coil. Hang the coil from the excess wire end so that its opposite end (the 6 inch lead end) is about 1 inch or so above a metal plate. Strip one end of one 15 foot of INSULATED wire that remains and connect it to the metal plate. If you can drill and tap an 8-32 or 10-32 screw into the plate, this works well for attaching the wire. You could also drill a hole and bolt the wire to the plate that way. The other end of the insulated wire goes to the battery; however, close to the battery terminal (doesn't matter which one) this wire will be cut so that the fuseholder can be inserted into this line. Diagram shows coil hung above metal plate.



Step 4: The fuseholder (15 or 20 amp fuse) is inserted into the INSULATED wire at a location near the battery terminal, using wire nuts. Just cut the insulated wire near the battery and remove about an inch of insulation from each of the two cut ends. Then install the fuseholder by twisting the wires from the fuseholder around each "bare wire" end of the cut wire. The bare copper wire coming from the "Jumping Jack" coil is connected directly to the other terminal of the battery. If you need to extend this bare wire, use wire that's left. The diagram below shows these connections. T he particular terminal polarity is not marked because it is not important to the operation.



Omarshauntedtrail.com

Operation

It's very simple to start the Jumpin Jack action once everything has been assembled and all wires are in place including connections to the battery terminals. Just pull the end of the coil (at 12 volts no shock danger) so that it touches the metal plate (close the 1" gap) and let go. Zap, zowie, zingie, the thing should keep going ...sparking and arcing as it goes. To keep it going you may have to make some turn spacing adjustments or gap adjustment. Turn spacing is changed slightly by either squeezing or pulling on the coil. The gap is changed by adjusting the coil mounting point.

Theory of Operation
(or "how does that work?")

_____

When an electric current grows or diminishes in a wire it causes a changing magnetic effect in the vicinity of that wire. A changing current can cause a wire's electromagnetic effect to change poles. When this happens in a coil of wire it causes adjacent turns to attract each other when the current increases and repel each other when the current decreases.

When the end of the coil touches the metal plate and the current in the coil starts to increase, its turns are pulled together causing the free wire end to leave the plate. As the current starts to decrease, the turns suddenly repel each other expanding the coil forcing its end to again touch the plate, etc.

Jim Kadel
July 9, 1998

Obtained from
Omarshauntedtrail.com