High Frequency Generator

High frequency generator by Electro-Technic Products (ETP) Model BD-10A.

Intended for intermittent use, no more than 10 minutes at a time. It has an output of between 20,000 to 45,000 volts at a frequency of approximately 500 kHz when properly adjusted. When the electrode is held within 1/4 to 1 in. from a metal object a spark will jump to the metal. The spark outputs a current of about 1 mA.

The high frequency generator is a variation of a tesla coil. It has a primary coil which produces an output voltage of about 1200 V at the input line frequency, 50 or 60 Hz. This output voltage is interrupted by a vibrating contact, energized by this coil at twice the line frequency. The output voltage of this primary coil is connected to capacitors, which are then discharged into a high voltage coil.

The capacitance, resistance and inductance of this circuit is designed to oscillate, or ring at a very high frequency, in this case 500 kHz. The output of this high voltage coil is adjustable by varying the distance of the vibrating contacts, which is controllable by the knob on the backside of the device.

Questions

1. What is this device used for?
2. What is the difference between AC power and DC power?

Answers

1. They are used for pinhole leak detection in insulation or linings of vacuum tanks. If insulation on a wire, tank, piece of metal, etc is incomplete, the a spark will jump from the high frequency generator to the exposed metal (even if the exposed portion of metal is too small to be seen).
2. In DC (direct), the electrons flow steadily in a single direction, or "forward." In AC (alternating), electrons keep switching directions, sometimes going "forwards" and then going "backwards." The power that comes from wall outlets is AC and the power from a AA or car battery is DC.