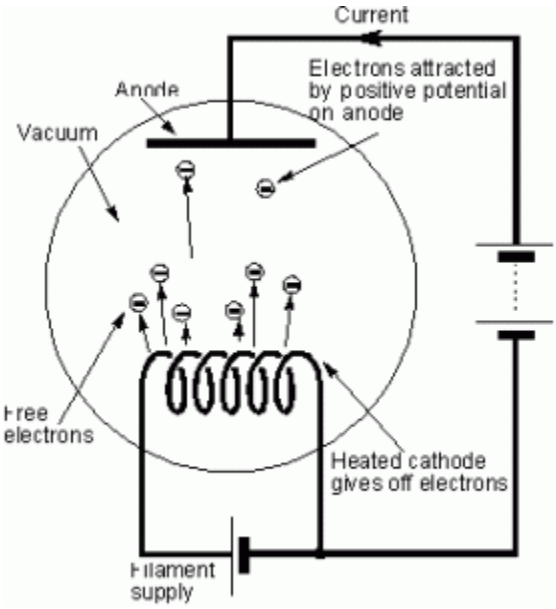
VACUUM TUBE DIODES- INTRODUCTION

Vacuum Diodes-Applications and Construction

The simplest form of the electron tube for the production and control of free electrons is a Vacuum diode. Two electrodes are there for a vacuum diode known as anode and cathode. Cathode serves as an emitter of electrons where as anode serves as a collector of electrons. Cathode may be a simple filament of tungsten or thoriated tungsten. It can also be a nickel tube coated with barium oxide or strontium oxide. Oxide coated cathode shows greater emission efficiency.

Anode is usually a hollow metallic cylinder,it can be of nickel or iron but in case of high power tantalum, molybdenum or graphite may be used. This is because at high power nickel or iron may deteriorate. The anode is made larger to dissipate heat without excessive rise in temperature.Usually cooling fins are fitted with an anode for removal of the heat produced at the anode. Anode surface may be blackened and roughened for the same purpose of easy heat

removal.



Operation of a Vacuum diode:

Basic law of electricity is the basic operating principle of a vacuum diode, which is nothing but "like poles repel and opposite poles attract". Electrons emitted from cathode are negetive charges, you know that. These negetive charges are either attracted/repelled at the anode,depending on whether the anode is positively/negetively charged.

When a metallic cathode is heated sufficiently an invisible cloud of electrons is set free in the space to form a *space charge. The space charge exerts a repelling force on the electrons emitted from cathode. If the anode is made positive w.r.t cathode then an electric field will be created from anode to cathode,* and the electrons in the space charge are attracted by the anode and consequently current flows through the tube.

Operation of a Vacuum diode can be simplified as follows:

1) The diode conducts only when the anode or plate is made positive w.r.t cathode. It will not conduct in opposite direction.

2) Electron flow within diode takes place only from cathode to anode and never from anode to cathode. This unidirectional conduction enables the diode to act like a switch/valve automatically starting or stopping conduction depending upon whether the plate is positive or negetive respect to cathode. This property permits the diode to act as a rectifier

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