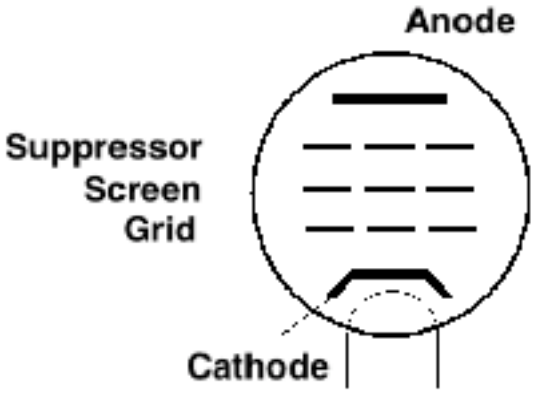
Pentode

- 5 electrodes (*Pent*ode).
- Normally used as an amplifier.
- Offers higher gain than Triodes
- Remedies secondary emission issues of Tetrodes



The Cathode emits electrons when heated which will flow to the Anode if a positive voltage (with respect to the cathode) is applied. Current will not flow in the reverse direction.

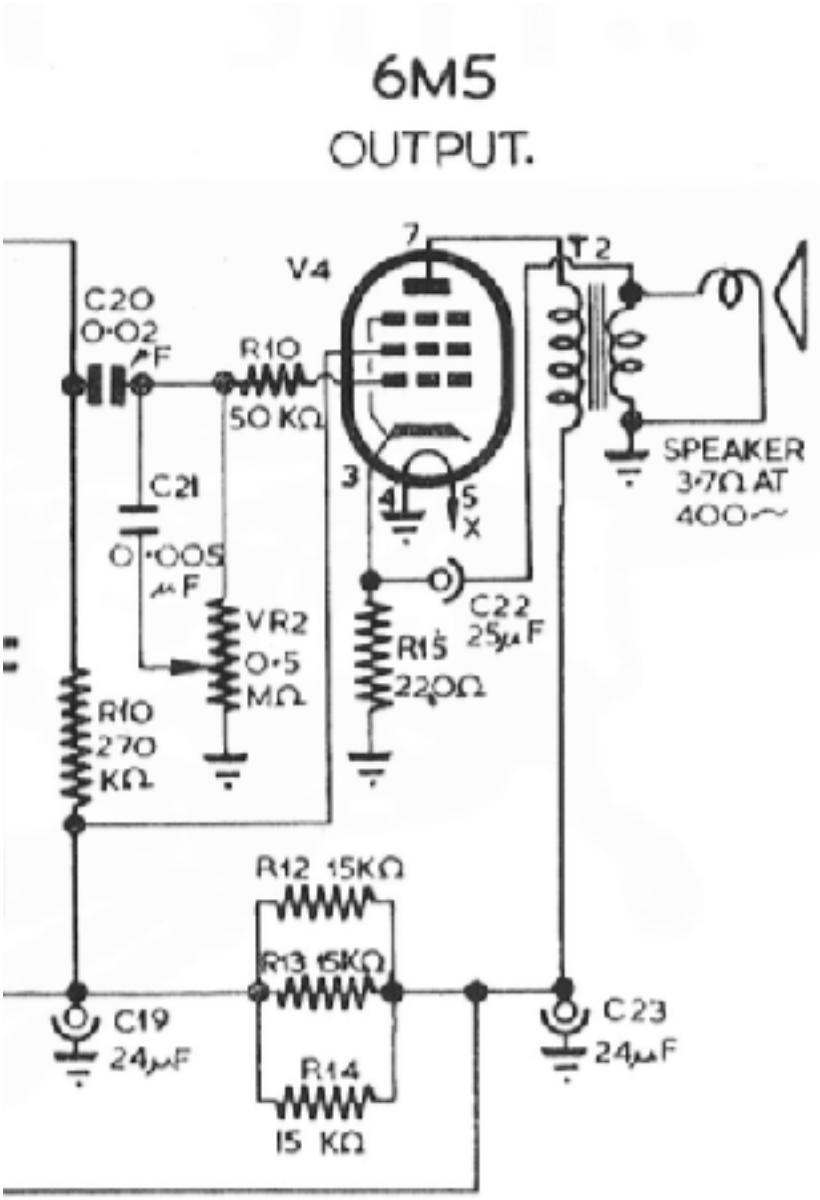
An electrode called the Control Grid or simply Grid is placed between the Cathode and Anode. When a negative voltage is applied to the Grid the flow of electrons between the Cathode and Anode is reduced due to negative electrostatic field.

A Screen Grid between the Control Grid and the Anode neutralises the Millar capacitance effect allowing the Pentodes to operate at higher gain levels than the Triode. A positive voltage slightly lower than the Anode is applied to the Screen Grid.

An additional element called the Suppressor Grid is placed between the Screen Grid and the Anode. This Grid is held at the Cathode or Ground voltage and has the effect of electrostatically replying any secondary emission electrons back to the Anode rather than the Screen Grid.

Pentodes often have the Suppressor Grid internally connected to the Cathode.

Example Circuit



This Pentode is configured to operate as an amplifier. The Characteristics need to be reviewed and components chosen to ensure the device is operating in a linear region.

Just as in the Triode circuit this circuit is implementing Cathode bias to achieve this. Please refer to my Triode data sheet for a full explanation.

A secondary HT voltage is derived by R12,13,14 and filtered by C19. This is slightly lower than the Anode voltage appearing on C23, and is applied to the Screen Grid.

In the case of this Pentode the Suppressor Grid is internally connected to the Cathode.

The input signal is applied to the Grid via capacitor C20, note there is a crude tone control network implemented in the Grid circuit.

Additionally a Feedback capacitor C22 provides a small amount of negative feedback to the Cathode to ensure the application stage is stable.