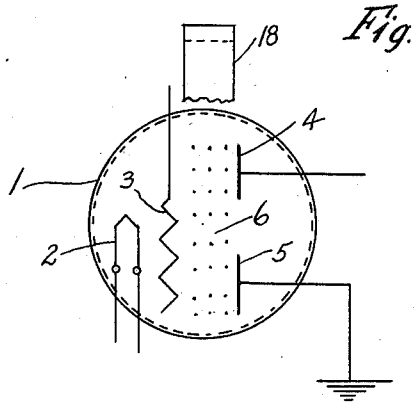
March 22, 1938. A. G. THOMAS 2,111,649

ELECTRON DISCHARGE TUBE

Original Filed May 13, 1936

Fig. 1



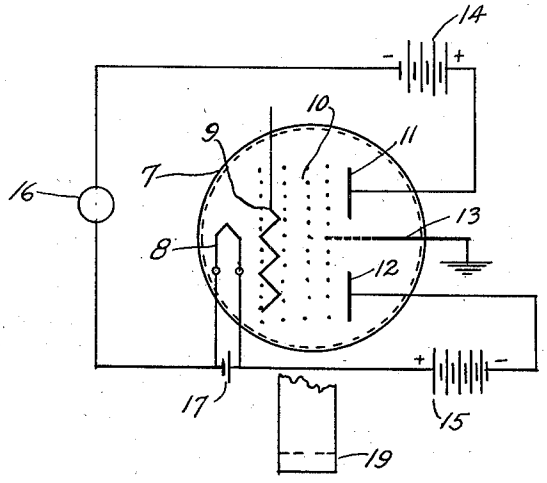


Fig. 2

Albert G. Thomas

Inventor

Patented Mar. 22, 1938 2,111,649

UNITED STATES PATENT OFFICE

2,111,649

ELECTRON DISCHARGE TUBE

Albert G. Thomas, Lynchburg, Va.

Original application May 13, 1936, Serial No. 79,420. Divided and this application April 24, 1937, Serial No. 138,693

2 Claims. (Cl. 250—27.5)

This invention relates to electron discharge tubes and is a division from my application, Serial No. 79,420, filed May 13, 1936.

A principal object is to provide a tube in which the advantages of gaseous ionization may be employed, without the usual erratic behaviour which in the past has limited the uses of gaseous tubes.

Another object is to provide a tube of greater stability than the usual vacuum tube.

In the drawing:

Figure 1 is an elevation of a vacuum tube employing a deflecting magnetic field and two plates, one of them being grounded.

Figure 2 is an elevation of a vacuum tube with a grounded shield between two plates, one of which is positively charged and the other negatively charged with respect to the cathode.

In Figure 1 tube 1 has filament 2, grid 3, plate 4, and auxiliary plate 5 placed as shown and grounded. A suitable gas, preferably one producing positive ions, is contained in tube 1 so that the gas molecules will be ionized in well-known manner to produce charged ions and electrons.

Magnetic field 6, seen endwise, is provided by magnet 18 shown broken away, so that negative electrons liberated from filament 2 or from gas in tube 1 will be deflected upward to plate 4 but positive gas ions will be deflected downward to strike against grounded plate 5 and so will become neutralized. Grid 3 controls the current as usual. A series of grounded plates 5 placed at strategic points may be used.

This tube then will make possible the use of high gaseous ionization produced from electronic bombardment or otherwise, with resulting increased currents since the erratic gaseous ions are deflected from the main current stream. A suitable gas would be hydrogen, which produces positively charged ions.

In Figure 2 a similar principle to that employed in the tube illustrated in Figure 1 is used. Tube 7 has filament 8 fed by battery 17. The negative terminal of plate battery 14 is connected to filament 8 through output element 16 and the positive terminal is connected to plate 11. The negative terminal of battery 15 is connected to plate 12 and the positive terminal to filament 8. Placed between plates 11 and 12 may be grounded shield 13 to separate the oppositely disposed fields. Control grid 9 is placed in cross magnetic field 10 produced by magnet 19 shown broken away, which field serves to deflect negatively charged electrons to plate 11 and positively charged gas ions to plate 12. It will be noted also that plate 12 is negatively charged by battery 15, with respect to filament 8, so that the positive ions will be electrostatically attracted to plate 12 and so will be removed from the output current stream. Shield 13 may be eliminated if desired. Grid 9 may be so placed that most of the positive ions produced by electronic bombardment will be deflected away from the grid 9 and so will not strike it.

This tube then will carry large currents with more stability than the usual form of tube containing an ionizable gas. A gas such as hydrogen may be introduced in proper amount into tube 7.

What I claim is:

1. An electron discharge tube comprising: a cathode, an anode, ionizable gas contained within said tube, neutralizing means within said tube for neutralizing positive ions of said gas, and means for creating a magnetic field to direct said positive ions to strike said neutralizing means.

2. An electron discharge tube comprising: a cathode, an anode, ionizable gas contained within said tube, an element adapted to be connected to ground, and magnetic means for directing positive ions of said gas to strike said element.

ALBERT G. THOMAS.