April 17, 1934. F. SCHRÖTER 1,955,391

ELECTRODE CONSTRUCTION FOR GLOW DISCHARGE TUBES

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Fig. 1

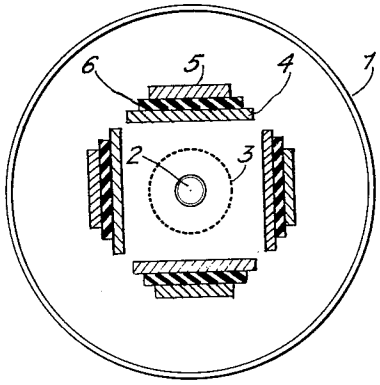


Fig. 2

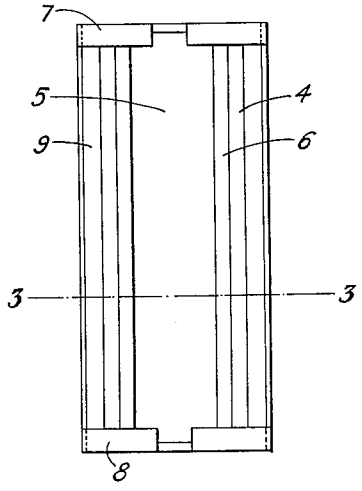
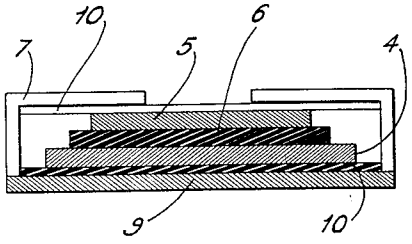


Fig. 3



INVENTOR
FRITZ SCHROTER
BY H. S. Grover
ATTORNEY

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ELECTRODE CONSTRUCTION FOR GLOW DISCHARGE TUBES

Fritz Schröter, Berlin, Germany, assignor to Telefunken Gesellschaft fur Drahtlose Telegraphie m. b. H., Berlin, Germany, a corporation of Germany

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4 Claims. (Cl. 250—27.5)

The invention relates to amplifier tubes having a gaseous atmosphere wherein the electron source consists of a glow or gaseous discharge. The electrons, beyond the anode of this discharge, are attracted by the field of the amplifier anode or the plate and flow towards it in quantities subject to the control action of a grid. In order that the grid current incidentally arising may be minimized the anode for the electron-supplying glow discharge is so shaped and is so disposed in reference to the glow that it cuts off all rectilinear connection between the glow and the amplifier space.

The invention relates to a tube of this kind, and its object is to make the screening effect of the anode of the glow discharge still more effective, while insuring at the same time a rugged mounting of the glow discharge electrodes. To this end the flat or strip shaped glow discharge cathode is snugly laid upon a broader glow discharge anode, which is likewise flat or strip shaped, between these two electrodes is interposed an insulating layer, and both electrodes are united as shown in the drawing by insulating connections so as to result in a unit or assembly. The negative glow therefore is able to arise only upon the free surface of the cathode strip. Now, if the assembly is mounted inside the amplifier tube in such a way that the cathode surface is turned away from the space containing the control grid and the amplifier anode or plate, the functional conditions first indicated are fulfilled inasmuch as the broader glow discharge anode completely screens the amplifier space from the glow discharge, and the paths of the electron issuing from the glow will be predominantly in directions away from the amplifier electrodes, owing to the surface effect of the cathode. Hence, the electrons will be able to reach the field of the amplifier anode only in roundabout ways, i. e., after being appreciably retarded or slowed up by multiple collisions with gas particles.

In the accompanying drawing which illustrates one embodiment of the invention by way of example; Figure 1 is a diagrammatic top view of an amplifier having a coaxial arrangement of the electrodes; Figure 2 is a front view and Figure 3 a cross section on the line 3—3 of Figure 2. In the drawing 1 is the wall of the tube bulb, 2 is a cylindrical amplifier anode or plate positioned in the axis of the bulb, 3 is the control grid surrounding the said plate, and 4 and 5 are the constructionally intimately united parts of the glow discharge electrode system or unit, 4 being the anode and 5 the cathode. The electrons in the main will be able to escape only in directions away from the plate 2, hence, they will first reach the range of the control grid after a considerable number of reflecting collisions.

In Figs. 2 and 3 the mounting of the electrodes 4 and 5 is shown upon an enlarged scale. In these figures 6 is the insulating layer interposed between 4 and 5 and consisting preferably of a slender strip of mica, and 7 and 8 are clamps or fingers at the ends of an electrode holder 9 in which the electrodes 4 and 5 are held by strips 10 of mica or other insulation lying across the ends of the electrodes and clamped down on the electrodes by the fingers 7 and 8, which are insulated from the electrodes but hold them firmly in place, the holder and the electrodes forming a unit or assembly in which the electrodes are accurately and firmly positioned. The holders are easily mounted in the tube without affecting the relative positions of the electrodes.

Having thus described my invention, what I claim is:

1. A gaseous discharge amplifier comprising a sealed envelope enclosing a plate, a control grid, and a glow discharge electron source comprising a flat cathode and a flat anode wider than said cathode, a sheet of insulation sandwiched between and in contact with said anode and cathode throughout their length, and means for holding said anode and said cathode with said anode interposed between said cathode and said plate.

2. A gaseous discharge amplifier comprising a sealed envelope enclosing a plate, a control grid, and a glow discharge electron source comprising a flat cathode and a flat anode wider than said cathode, a sheet of insulation sandwiched between and in contact with said anode and cathode throughout their length, a holder for clamping together said anode, said sheet of insulation and said cathode with one side of said cathode exposed, said holder being insulated from said anode and said cathode and mounted with the exposed surface of said cathode turned away from said plate.

3. A gaseous discharge amplifier comprising a sealed envelope enclosing a plate, a control grid

enclosing said plate, and a plurality of glow discharge electron sources disposed about said plate as a center, each of said sources comprising a strip cathode and a strip anode wider than its cooperating cathode and interposed between said cathode and said plate, and insulation between and in contact with said anode and said cathode to confine a glow discharge on said cathode to the surface turned away from said plate.

4. A unitary glow discharge electron source for gaseous amplifiers comprising a flat cathode, a flat anode wider than said cathode, a sheet of insulation sandwiched between and in contact with said anode and said cathode, a holder adjacent said anode and having at each end clamping fingers to encircle said anode and engage said cathode, and insulation between said cathode and said fingers and between said holder and said anode.

FRITZ SCHRÖTER.