Dec. 31, 1940. K. SCHLESINGER 2,227,025

ELECTRON TUBE ARRANGEMENT

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Fig. 1

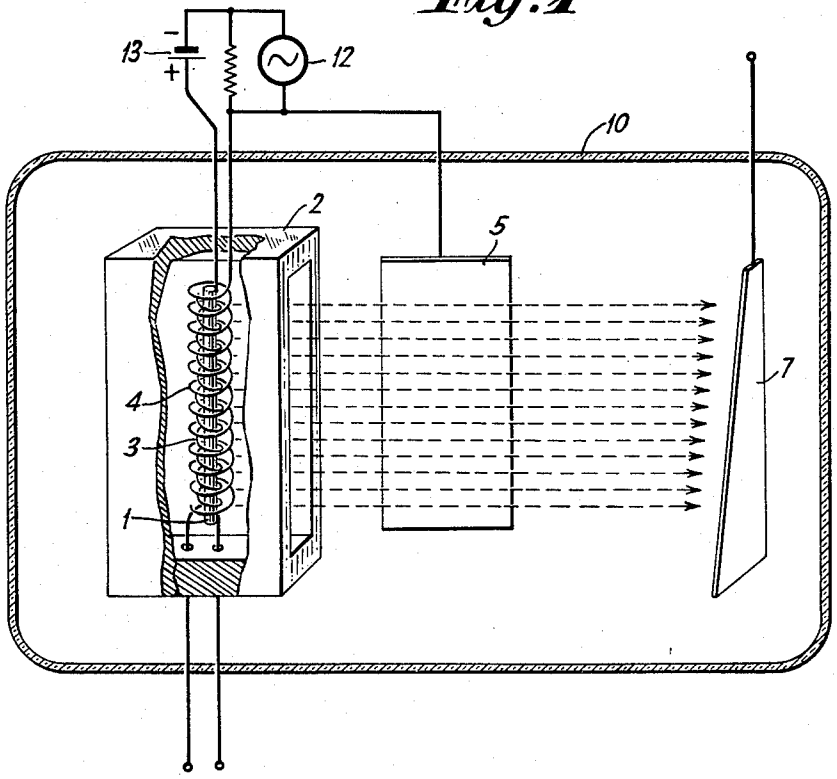
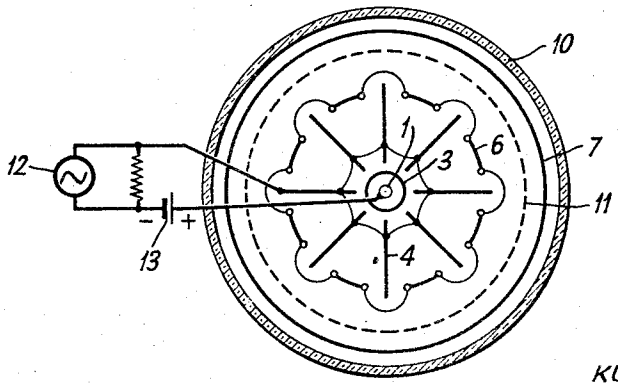


Fig. 2



INVENTOR
KURT SCHLESINGER
BY W. S. Brooks.
ATTORNEY

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ELECTRON TUBE ARRANGEMENT

Kurt Schlesinger, Berlin, Germany, assignor, by mesne assignments, to Loewe Radio, Inc., a corporation of New York

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2 Claims. (Cl. 250—27)

The object of the invention is an electron tube arrangement, more particularly for rectifying and potential-amplifying purposes.

According to the invention, the electronic current produced by a hot cathode, preferably an indirectly heated equipotential cathode, is controlled on the one hand in the manner known per se by space charge control, and at the same time, additionally thereto, likewise in the manner known per se, by deflection (selection) control.

According to the invention, special means may be provided, which enable the electrons to be formed into a flat electronic band. Means of this kind, however, are not absolutely essential, as the electrons leave the surface of the cathode in a direction perpendicular to this surface.

It is also possible in accordance with the invention to provide in the electron tube additional grids, such as space charge, screening and interception or suppressor grids.

The form of embodiment of the arrangement according to the invention is illustrated diagrammatically by way of example in the drawing, wherein:

Figure 1 shows one form of the present invention, and

Figure 2 shows a modified form of the invention.

In Figure 1 there is shown a tube housing 10, inside of which is located a cathode 1, an electron concentrating element 2 which forms the electrons emitted by the cathode into a flat band or beam. A control electrode 4 and an auxiliary grid 3 are also provided. The anode or collector electrode is shown at 7 and between the anode 7 and the concentrating element is positioned a deflecting electrode 5.

The electronic current emitted by the cathode, which is preferably elongated, is controlled in intensity by the grid 4 through space charge control. The anode 7 is constructed in wedge-shape fashion, so that varying degrees or amounts of the flat electron beam are collected by the anode deepnding upon the potential applied to the deflecting electrode 5. A certain degree of beam modulation is produced by the element 4.

The application of the control voltage to grid 4 and to the deflecting electrode 5 is illustrated in Figure 1 by showing these two elements connected to a source of variable potential 12.

The control grid 4, and if desired the deflecting electrode 5, may be biased negatively with respect to the cathode by a source of potential 13.

The characteristics of the tube may be varied as desired by varying the profile or edge of the anode 7.

In Figure 2 of the drawing, 1 is the cathode, 4 are the preferably negatively biassed control plates, 6 the screening grid plates, 7 is the anode and 10 the wall of the tube. 3 and 11 are additional grids. The elements 4, if connected to a control voltage source 12 as shown, cause simultaneously a control of the emission and also a deflection of the emitted electrons. If the elements 4 are provided with a strong negative bias from a battery 13, the emitted electrons will be bunched together at the centre and intercepted by the elements 6, so that no electrons impinge against the anode. If on the other hand the control potential is shifted into positive the electrons are able to pass between the elements 4 and the elements 6 and meet against the anode 7.

The arrangement and embodiment of the elements 4 and 6 and also the biassing of these elements should be suitably selected for the particular purpose for which they are intended.

The form of embodiment illustrated in the drawing is particularly suitable as rectifier.

The invention is in no way limited to the form of embodiment illustrated, which has been quoted merely for the purpose of explanation.

The advantage of the arrangement according to the invention is to be regarded more particularly in the fact that the same permits of a very considerable increase in the steepness and an adaptation of the characteristic, practically as desired, to the particular purpose concerned.

I claim:

1. An electron discharge device comprising an elongated cathode, a control grid surrounding said cathode, a beam forming element substantially completely surrounding the cathode and control grid, said beam forming element having an elongated opening at one side thereof whereby a flat beam of electrons may be formed, a substantially planar anode positioned opposite the opening in said beam forming element and spaced therefrom, one edge of the anode being positioned at an angle with respect to the plane of the opening in said beam forming element, a deflecting electrode positioned between said beam forming element and said anode, means for maintaining said deflecting electrode and said control grid at a negative potential with respect to said cathode, and means for applying a voltage variation between said cathode and said control electrode

and deflecting electrode whereby varying amounts of the beam may be permitted to strike the anode.

2. An electron discharge device comprising an envelope, an elongated cathode positioned at one end of the envelope, a control grid surrounding said cathode, a beam forming element substantially completely surrounding the cathode and control grid, said beam forming element having an elongated opening at one side thereof, said opening lying in a plane including said elongated cathode whereby a flat beam of electrons may be produced, a substantially planar anode positioned at the other end of the tube opposite the opening in said beam forming element and spaced therefrom, the plane of said anode being positioned normal to the plane of the opening in said beam forming element and said cathode, one edge of said anode being inclined at an angle with respect to the plane of the cathode and opening in said beam forming element, a substantially flat deflecting electrode positioned between said beam forming element and said anode and located in a plane substantially parallel to the plane including said cathode and opening in said beam forming element but displaced therefrom, means for normally maintaining said deflecting electrode and said control grid at a negative potential with respect to said cathode, and means for applying a voltage variation between said cathode and said control electrode and deflecting electrode whereby varying amounts and intensities of the beam may be permitted to strike the anode.

KURT SCHLESINGER.