

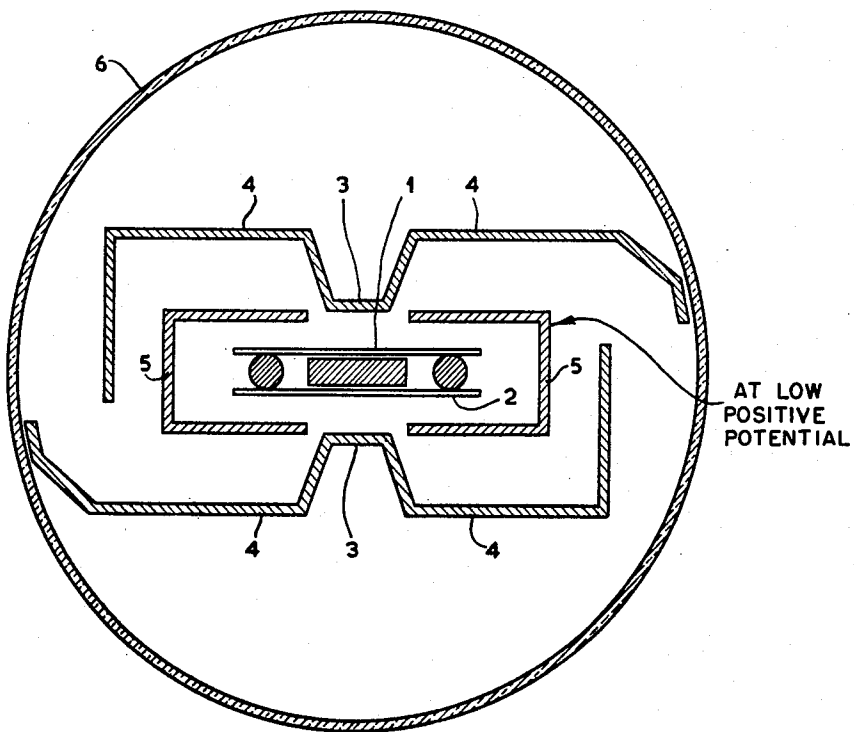
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ELECTRONIC VALVE WITH CO-PLANAR ANODE AND SHIELD SECTIONS

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ELECTRONIC VALVE WITH CO-PLANAR ANODE AND SHIELD SECTIONS

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5 Claims. (Cl. 313—293)

The present invention relates to electric discharge tubes for amplifying high-frequency electrical oscillations and more especially but not exclusively to substantially noise-free receiving tubes. Further, the invention relates to devices comprising such tubes.

On the first amplification stage of a receiver for high-frequency signals the condition is imposed that the tube should involve very little noise. In general, pentodes or tetrodes are employed which however, due to the electron-distribution between screen-grid and anode, involve distribution-noise as a result of the occurrence of screen-grid current. In this respect, a triode is advantageous, but it has the disadvantage of rather considerable reaction occurring between the anode and the grid due to the anode-grid capacity, so that neutralization is necessary. This is very difficult, in particular when exchanging valves. This disadvantage can be avoided by employing two triodes in "cascode" connection, but this is expensive.

It has now been found possible to build a valve which operates as a triode and does not practically suffer from said disadvantages.

In a valve the electrode system of which comprises a cathode, a grid, an anode and an auxiliary electrode, the anode consists, in accordance with the invention of two halves each having a re-entrant part facing the cathode and having approximately the same width as that of the cathode, which re-entrant parts constitute the active anode surface, while at both sides between the anode parts and the grid provision is made of screens, the free edges of which extend short of to the active anode parts in such manner that the anode-grid capacity is exclusively determined by the active parts of the grid and the anode. Since the screens extend completely beyond the electron beam, they do not practically take up electrons if they were positive but, since these screens do not practically influence the electron beam, they may advantageously be connected to a low positive potential or a zero potential. Consequently, the tube has the low noise of a triode and, moreover the low anode-grid reaction of a screen-grid tube. The capacity of the screens relative to the anode, cathode, grid and earth may be inserted in a readily adjustable neutralizing circuit arrangement.

In order that the invention may be readily carried into effect, an example will now be described in detail with reference to the accompanying drawing, which is a cross-section view of a valve according to the invention.

In the drawing, the reference numeral 1 designates the cathode which is surrounded by a grid 2. This grid consists of a wire tautly wound on a frame. The active anode parts 3 are constituted by re-entrant parts of anode plates 4 which moreover act as cooling fins. In accordance with the invention, preferably U-shaped screens 5 are provided between the anode plates 4 and the grid 2 so that the anode to grid capacity is exclusively determined by the capacity of the active parts of the grid 2 and the anode parts 3. Since the plates 5 do not practically influence the electron beam, they may have a low positive potential or zero potential so that no distribution noise occurs. The electrode system is housed in a glass

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bulb 6. The width of the anode parts 3 substantially corresponds to the width of the cathode 1, which permits the use of a narrow electron beam.

What is claimed is:

1. A vacuum tube operable in the V.H.F. signal range with dynamic characteristics comparable to a triode comprising a cathode electrode extending longitudinally of the tube, a control grid electrode composed of a wire grid spaced from and substantially surrounding said cathode electrode, a plate structure having an active anode portion supported opposite said wire grid and an inactive plate section extending from each longitudinal edge of said active anode portion, said inactive plate sections being more remotely spaced from the wire grid than the active anode portion spacing, and a shield member interposed between each of said inactive plate sections and said grid electrode, each shield member having an edge region substantially coplanar with said active anode portion and positioned close to a respective longitudinal edge of the active anode portion for effectively inhibiting capacitance between said grid electrode and the inactive plate sections.

2. A vacuum tube operable in the V.H.F. signal range with dynamic characteristics comparable to a triode comprising a cathode electrode extending longitudinally of the tube, a control grid electrode composed of a wire grid substantially surrounding said cathode electrode, a plate structure comprising first and second sections substantially surrounding said control grid, said plate structure having at least one planar active anode portion extending integrally therefrom to a position closer to said wire grid than that of residual inactive sections thereof, and shield members interposed between said wire grid and the inactive plate sections, each shield member having an edge region substantially coplanar with said active anode portion and positioned close thereto, said shield members extending about said wire grid to constitute with said active anode portion an array within the plate structure, whereby capacitance between said grid electrode and the plate structure is substantially reduced.

3. A vacuum tube as claimed in claim 1, in which the total area of said inactive plate sections is substantially greater than the total area of said active anode portions, whereby the effective capacitance between said control grid electrode and the plate structure is reduced by a substantial factor by said shield members and the dynamic plate resistance of the vacuum tube is correspondingly increased.

4. A vacuum tube as claimed in claim 2, in which said plate structure contains a second planar active anode portion supported opposite said wire grid in symmetrical relationship with the first said active anode portion, said second active anode portion being arranged in the interior array with said shield members and in close proximity therewith.

5. An electric discharge device including a vacuum tube as claimed in claim 2 having means to apply a small positive potential to said shield electrode.

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