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GRID CONTROLLED TUBE WITH ELECTRON MULTIPLIER

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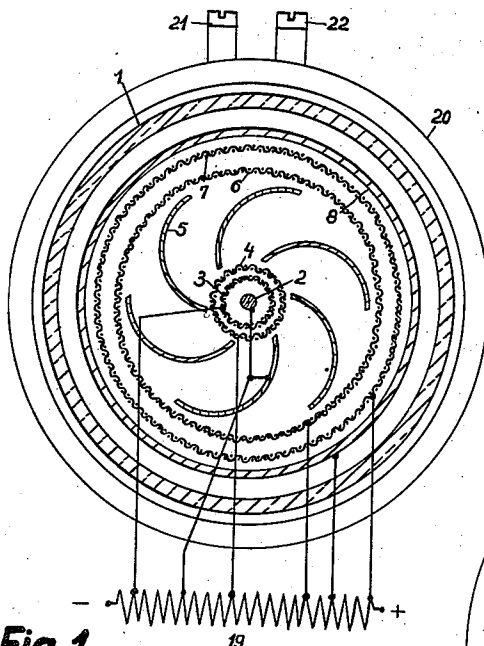


Fig. 1

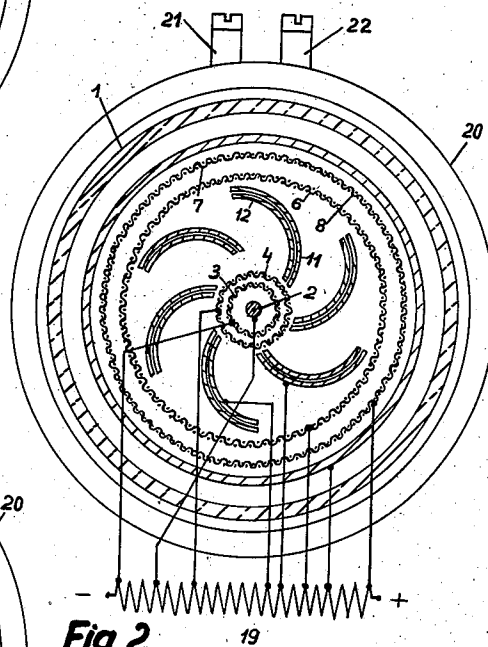


Fig. 2

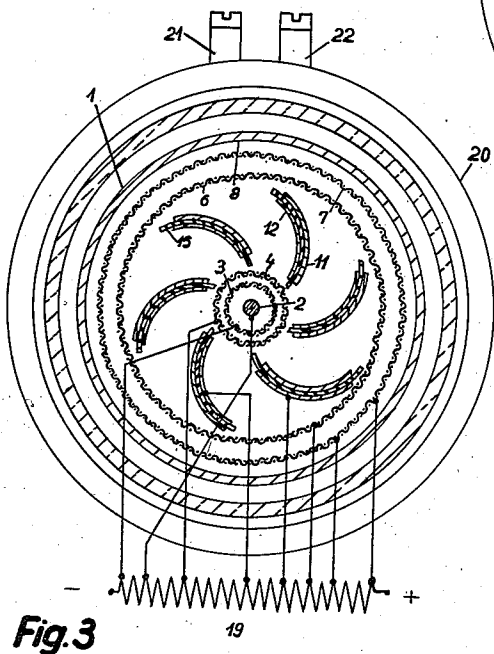


Fig. 3

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GRID CONTROLLED TUBE WITH ELECTRON MULTIPLIER

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3 Claims. (Cl. 250-174)

The object of the present invention is a grid-controlled amplifying tube provided with internal electron multiplication, the secondary emissive cathodes being nets which are co-axially arranged between the grids surrounding the hot cathode and the cylindrical anode. It has been noticed that the multiplication factor of such tubes diminishes slowly by the fact that volatilized particles, probably of barium, are emitted by the cathode and damage the sensitive layer of the nets.

According to the invention this drawback is dealt with by arranging, between the outermost of the grids and the innermost of the nets, shield plates which are spirally bent so that the particles are screened off whilst the electrons by electromagnetic or electrostatic or mixed fields are so deflected that they pass between said shield plates in curved paths.

The invention is clearly explained in the accompanying drawing in which

Fig. 1 is a cross-section through a tube according to the invention, whilst

Figs. 2 and 3, also in cross-section, show different constructions of the shield plates.

In Fig. 1, 1 is the glass bulb of the tube, 2 the hot cathode, 3 the control grid, 4 an accelerating grid which may be present or not, 6 and 7 a series of secondary emissive nets the last one of which acts as anode, and 8 a secondary emissive plate. All these electrodes are co-axially arranged. Between the outermost grid and the innermost nets there are located shield plates of such number and such curvature that the nets are perfectly screened against said particles. The potentials of the electrodes may be

Electrode -----	3	2	5	4	6	8	7
Volts-----	-15	0	0	50	100	200	250

Plates 5 may have as well a weak negative potential. A potentiometer 19 fed by the anode potential source may supply the electrodes with the said potentials.

The deflection of the electrons emitted by the cathode is already effected by the anodic field acting between the plates 5. If necessary a longitudinal magnetic field may be used, generated e. g. by a coil 20 surrounding the bulb and being connected at its terminals 21-22 to a source of a continuous current.

Without a magnetic field the bending of the electron paths may be done in the following way:

According to Fig. 2 each of the shields consists of two parallel plates 11-12 which are close together and have a positive potential, 11 a stronger one than 12 so that the electrons passing through the shields are deflected in the desired sense.

Instead of the double plates according to Fig. 2 the shields may consist, according to Fig. 3, of curved plates 15 of insulating material, preferably mica, which are covered with conductive layers 11-12.

I claim:

1. A grid-controlled amplifying tube comprising a linear incandescible cathode, a grid, a secondary emissive net and an anode, all said electrodes being co-axially mounted, a plurality of spirally curved shield plates mounted between said grid and said net for protecting said net against volatilized particles emitted by said cathode, and means for deflecting the electrons emitted by said cathode to pass between said shields.

2. A grid-controlled amplifying tube comprising a linear incandescible cathode, a grid, a secondary emissive net and an anode, all said electrodes being co-axially mounted, a plurality of spirally curved shield plates mounted between said grid and said net for protecting said net against volatilized particles emitted by said cathode, each of said shield plates consisting of two parallel plates adapted to be connected with different positive potentials for deflecting the electrons emitted by said cathode to pass between said shields.

3. A grid-controlled amplifying tube comprising a linear incandescible cathode, a grid, a secondary emissive net and an anode, all said electrodes being co-axially mounted, a plurality of spirally curved shield plates mounted between said grid and said net for protecting said net against volatilized particles emitted by said cathode, each of said shield plates consisting of an insulating plate covered on both sides with a conductive layer, said layers adapted to be connected with different positive potentials for deflecting the electrons emitted by said cathode to pass between said shields.

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