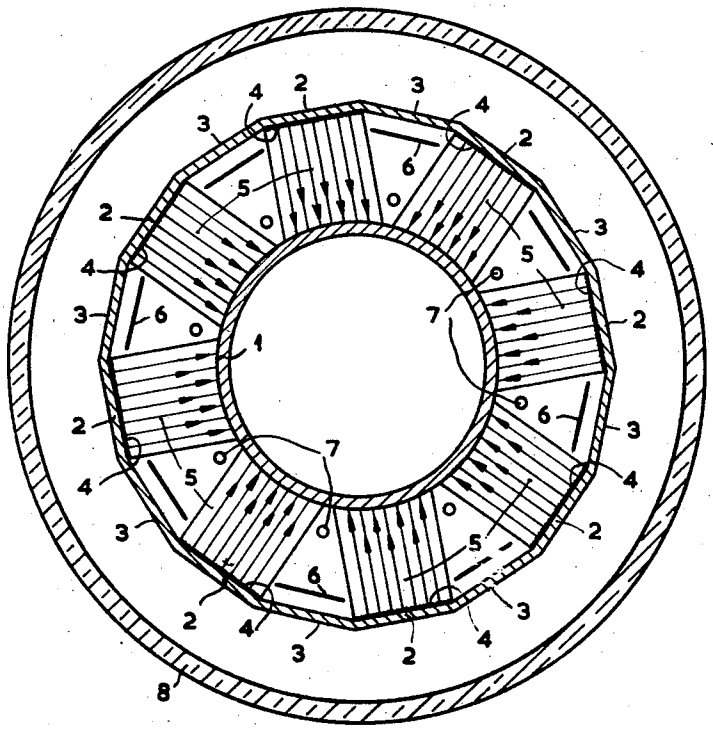
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ELECTRIC DISCHARGE TUBE

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ELECTRIC DISCHARGE TUBE

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1 Claim. (Cl. 313—70)

This invention relates to electric discharge tubes for producing or amplifying electric oscillations and for great currents in which an anode is surrounded by one or more auxiliary electrodes and a cylindrical cathode.

In such tubes for great currents there exists the difficulty that the auxiliary electrodes may be overheated because they are struck by electrons and surrounded by the hot cathode. A known means of avoiding this drawback as much as possible is to concentrate the stream of electrons into beams, in such a manner that the beams just pass through the apertures of the auxiliary electrodes. This has led to complicated constructions, in which the active parts of several grid-shaped electrodes are placed one after the other and in which separate auxiliary electrodes may have been provided for concentrating the stream of electrons into beams.

A very simple and efficacious construction is obtained in such tubes in which the anode and the auxiliary electrodes are contained within the cathode, if, according to the invention, the cathode comprises a cylinder, the cross-section of which is a regular sixteen-angle in which the inner surfaces of the parts of the cathode cylinder are alternately electron-emitting and not electron-emitting, while the auxiliary electrodes are provided between the non-emitting parts of the cathode cylinder and the anode, so that they can affect the adjacent stream of electrons without themselves being struck by electrons.

Owing to the fact that the cross-section of the cathode cylinder is a regular sixteen-angle, the cathode cylinder is formed by each time folding a part of a plane through

an angle of 22.5°, as a result of which each electron-emitting part, together with the adjacent non-emitting parts, forms an optical system producing a beam, which system is known as a "Pierce" optical system. As a result, the electrons of each electron-emitting part of the cathode flow is a beam with practically parallel electron paths. The auxiliary electrodes are then provided in the electron-free spaces formed between the beams.

In order that the invention may be readily carried into effect, it will now be described in greater detail with reference to the accompanying drawing, the figure of which schematically shows a cross-section of a definite form of a tube according to the invention.

In the figure, 1 is the central cylindrical anode which, in general, can be cooled with water. The anode 1 is surrounded by the sixteen-angular cathode cylinder, of which the inner surfaces of the parts 2 are covered with electron-emitting material 4, whereas the parts 3 are non-emitting. Owing to the fact that the angles made by the parts 2 and 3 are each 180—22.5=157.5°, the electrons flow in beams 5 along parallel paths. In the electron-free spaces, the control electrodes 6 and screen electrodes 7 may be provided, in such manner that the electron streams can be influenced by them, without these electrons conveying a stream worth mentioning. In this manner, for example triode tubes and tetrode tubes for great currents can be manufactured in a simple manner. The whole is surrounded by a bulb 8.

What is claimed is:

An electron discharge tube comprising an anode, a generally cylindrical cathode surrounding and spaced from the anode, and at least one control electrode between the cathode and the anode, the cross-section of said cathode cylinder being a sixteen-sided figure, alternate inner surfaces of the cathode cylinder being provided with electron-emissive material, the control electrode being positioned between a non-emissive surface and the anode to control adjacent electron beams without being struck by electrons.

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