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DISPENSER TYPE CATHODE HAVING GETTER-COATED PARTS

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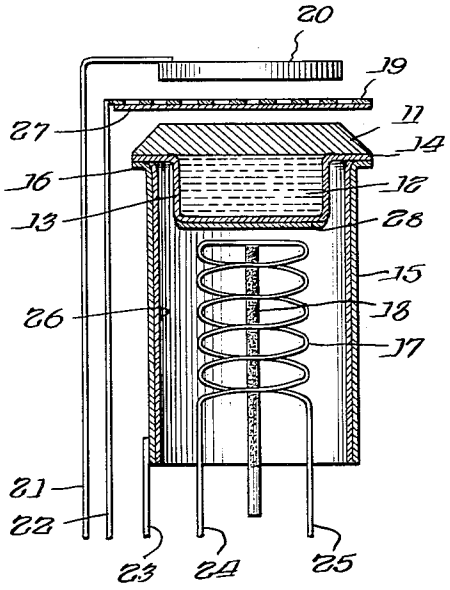

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DISPENSER TYPE CATHODE HAVING GETTER-COATED PARTS

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3 Claims. (Cl. 313—178)

This invention is concerned with incandescible dispenser type cathodes, for use in electrical discharge devices, having a supply of emissive material which migrates at operating temperature through fine passages of a cathode body to the emitting surface formed thereby.

The object of the invention is to improve the production and operation of discharge devices of the above indicated type by the provision of getter substance upon selected parts of the cathode which do not serve electron emission or upon selected parts of elements connected or associated with the cathode which are during operation strongly heated.

Discharge devices having incandescible dispenser type cathodes have been proposed before. The fine passages for the migration of the emissive material to the cathode surface may be formed by wire or the like means which is tightly wound about the cathode body or by the pores of a sintered cathode body made of materials such as tungsten or molybdenum which are particularly suitable when using thorium or barium compositions as emissive materials.

It was found that it is of great advantage in the manufacture and operation of tubes of the type indicated above, to provide therein a volatile metal such, for example, as zirconium, which exhibits at operating temperatures a getter action so as to remove traces of gas remaining after evacuation. Difficulties were, however, encountered in many cases, for example, in flat or disk-shaped cathodes, to select parts which become in operation hot enough so that the getter provided thereon would develop a satisfactory action.

The invention solves the problem as indicated before, by providing the getter on selected parts which do not serve electron emission but are subjected to strong heating. The getter is disposed so as to avoid interference with the radiation properties of the cathode.

The invention will be explained with reference to the accompanying drawing showing in diagrammatic manner an example thereof.

Numeral **11** indicates a flat or disklike cathode body of sintered tungsten or molybdenum. The emissive material **12** which may be barium or thorium is disposed in a receptacle **13** having a flange **14** which is suitably secured to the cathode body **11**, for example, by soldering or welding. A tubular supporting member **15** having a flange **16** is similarly secured to the flange of the receptacle **13**. The heater filament **17** is supported by the rod **18**. Numeral **19** indicates a grid, **20** the anode, and **21** to **25** are connecting and terminal conductors for the various parts. Additional heater means (not shown) may be provided, for example, in the space between the side wall of the receptacle **13** and the inside wall of the supporting member **15**. The envelope for the discharge tube has been omitted to avoid encumbering the drawing. It is understood of course that the various parts are by known and suitable means secured within the tube envelope and that the terminal conductors are carried to the outside of the tube in vacuumtight manner.

A getter substance, for example, zirconium, may be disposed on the inside of the tubular supporting member **15** as indicated at **26**. The getter may also be provided on selected parts of the grid **19**, as indicated at **27**, and if desired also on the rod **18**, as indicated by the shading, or on the bottom of the receptacle **13**, as indicated at **28**. The side wall of the receptacle **13** may be provided with getter substance if desired.

While it is possible to dispose getter substance on all the elements noted above, it will suffice for most practical purposes to provide the getter only on selected parts or portions of some of the elements.

The drawing shows a cylindrical structure having a circular cathode body of flat or disklike shape. It is understood of course that the structure may be cross-sectionally rectangular or the like.

Changes may be made within the scope and spirit of the appended claims.

I claim:

1. A dispenser type cathode for use in an electrical discharge device comprising a cathode body, a first element having a portion connected to said cathode body peripherally on one side thereof and forming therewith a receptacle containing an emissive material, a second tubular element having one end thereof connected to the portion of said first element which is connected to said cathode body peripherally on one side thereof and extending axially therefrom, the side of said cathode which faces axially away from said elements being entirely exposed and forming the emitting surface, the inside wall of said tubular second element surrounding a portion of the outside wall of said first element and forming a chamber therewith, a heater filament disposed within said chamber in spaced relation to each of said elements and means separate from said elements for connecting current to said filament to cause it to generate heat within said chamber for transfer substantially by radiation therefrom respectively to said first and said second elements so as to heat said emissive material and said cathode body for the purpose of causing migration of emissive material from said receptacle through said cathode body to the emitting surface formed thereby for emission therefrom substantially over the entire area of said surface, and a getter substance disposed on the side of the wall means of at least one of said elements which faces said heater filament.

2. A dispenser type cathode for use in an electrical discharge device comprising a cathode body, a first element having a portion connected to said cathode body peripherally on one side thereof and forming therewith a receptacle containing an emissive material, a second tubular element having one end thereof connected to the portion of said first element which is connected to said cathode body peripherally on one side thereof and extending axially therefrom, the side of said cathode body which faces axially away from said elements being entirely exposed and forming the emitting surface, the inside wall of said tubular second element surrounding a portion of the outside wall of said first element and forming a chamber therewith, a heater filament disposed within said chamber in spaced relation to said elements, a third element forming supporting member for said heater filament disposed in spaced relation thereto, means separate from said elements for connecting current to said filament to cause it to generate heat within said chamber for transfer substantially by radiation therefrom respectively to said first and said second and said third elements so as to heat said emissive material and said cathode body and also said third element for the purpose of causing migration of emissive material from said receptacle through said cathode body to the emitting surface formed thereby for emission therefrom substantially over the entire area of said surface, and a getter substance disposed on the side of

the wall means of at least one of said elements which faces said heater filament.

3. The structure defined in claim 1, comprising a disk-like substantially frusto-conical cathode body.

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