May 30, 1950 A. STANIER 2,509,702

CATHODE FOR THERMIONIC VALVES

Filed Jan. 14, 1947

Fig. 1.

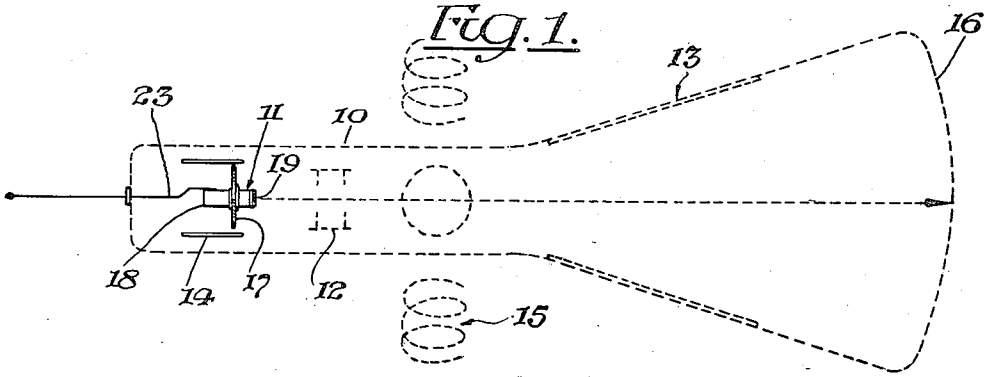


Fig. 2.

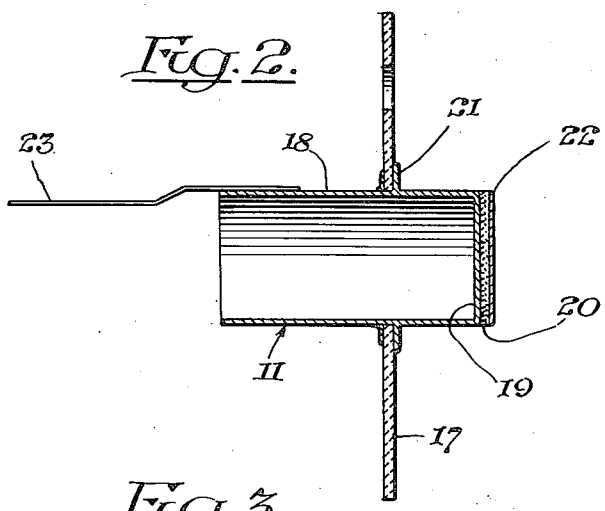
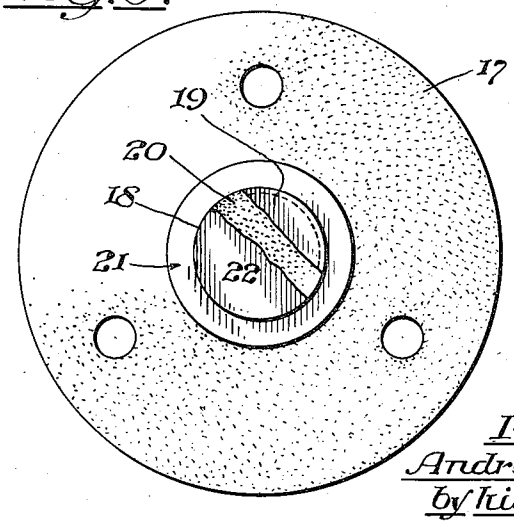


Fig. 3.



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CATHODE FOR THERMIONIC VALVES

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8 Claims. (Cl. 250—27.5)

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This invention relates to cathodes or filaments for thermionic valves, and particularly such as are used in the radio and television industry.

Where coated cathodes or filaments are employed within a thermionic valve, certain phenonema occur which interfere with the operation and life of the tube. One of the most objectionable results of such tube behavior arises in the use of a cathode ray tube in the television industry and is known as ion burn. The burn becomes apparent as a darkened area upon the fluorescent screen of the tube after it has been used for a period of time.

Accordingly, it is an object of this invention to provide a cathode for a cathode ray tube, which will eliminate ion burn on the tube screen.

Another object of this invention is to provide a cathode or filament which will increase the life of the tube.

A further object of this invention is to increase the catalytic action of the strontium carbonates commonly mixed with the barium carbonates with which cathodes are frequently coated.

An object of this invention is to provide a cathode structure which will eliminate the electrical leakage and grid emission which result from the deposition of foreign matter on the grid or insulators when the cathode tube is being evacuated or during the life of the tube.

A further object of this invention is to provide a structure which will avoid the damage done by undesirable formation of gases within a thermionic tube.

Another object of this invention is to achieve a purer form of electronic emission and a consequent higher efficiency of a thermionic tube.

Another feature of this invention is a metallic coating upon the outside of a coated cathode, which protects the free barium on the base metal from destruction as a result of excessive amounts of gases in the tube.

The invention consists of the construction, description and arrangement of parts, as herein illustrated, described and claimed.

In the accompanying drawings, forming part hereof, is illustrated one form of embodiment of the invention, in which similar reference characters designate corresponding parts, and in which:

Figure 1 is a schematic view of a cathode ray tube such as is used in a modern television receiver.

Figure 2 is a vertical section, greatly enlarged, of a cathode according to this invention.

Figure 3 is a plan view of the cathode shown in

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Figure 2, greatly enlarged, with certain portions cut away to show the construction.

Referring to the drawings, and particularly to Figure 1, 10 indicates a cathode ray tube of a standard form, comprising a cathode 11, an anode 12, accelerating anodes 13, control grids 14, deflecting coils 15, and a fluorescent screen 16, upon which the image is created.

The cathode 11, shown in Figure 1, is supported within the tube upon a pierced dielectric washer 17 which maintains it in its critical position within the tube's base assembly.

The cathode 11, shown greatly enlarged in Figures 2 and 3, is similar to that commonly used in the television industry in that it comprises a small metal sleeve 18, closed at one end 19, a lead wire 23 attached to the wall of the said sleeve, and a coating 20 of barium-strontium carbonates upon the closed end 19 of the cathode sleeve. A small collar 21 is provided upon the sleeve 18, to support the dielectric washer 17.

A suitable quantity of platinum 22 or spongy platinum is added to the coated surface 20 of the presently known cathode 11. Platinum metals, such as ruthenium, rhodium, palladium, osmium, or iridium, or alloys of metals having the desired properties of platinum, may also be used. This covering 22 may be applied as by flashing in a vacuum, or any other suitable manner. The preferred construction is clearly shown in Figure 3, in which the surface has been cut away to disclose the metal of the closed end 19 of the cathode sleeve 18, the coating of barium-strontium carbonates 20, and the covering 22 of platinum or similar suitable metals.

It has been found that the above described construction operates to absorb gases generated within the tube, and break down the said gases chemically during the process of tube evacuation. This result is brought about by the strong catalytic operation of the platinum or like coating 22. When the tube is in operation the coating 22 prevents the occurrence of ion burns upon the fluorescent screen 16, of the cathode ray tube 10.

The increase in the catalytic action which results from the coating 22 of platinum, protects the free barium on the base metal from destruction as a result of excessive amounts of gases in the tube. It thus increases the effectiveness of the strontium which is commonly used in cathode construction for that purpose. The efficiency of this type of cathode construction materially lengthens the life of the thermionic tube. Cathode sputtering is eliminated and harmful deposits on the grid, anodes or insulators, such as are

used in a locked-in cathode of a cathode ray tube, do not appear. In this manner, electrical leakage and grid emissions are eliminated.

While the drawings in this application have been confined to the cathode ray tube, it is within the purview of this invention to apply the principles herein set forth to all types of thermionic valves, without reference to their type or use.

Having thus fully described the invention, what is claimed as new and desired to be secured by Letters Patent of the United States, is:

1. An oxide coated cathode and an outer layer thereupon containing one of the platinum metals.

2. An oxide coated cathode and an outer layer thereupon of platinum.

3. An oxide coated cathode and an outer layer thereupon of spongy platinum.

4. An oxide coated cathode in the form of a sleeve, closed at one end, said end supporting the oxide coating and an outer layer thereupon of platinum.

5. An oxide coated cathode in the form of a sleeve, closed at one end, said end supporting the oxide coating and an outer layer thereupon of spongy platinum.

6. A cathode in the form of a sleeve, closed at one end, an oxide coating upon the said closure and a covering comprising a plurality of the platinum metals thereupon.

7. A cathode in the form of a sleeve, closed at one end, a coating of barium-strontium oxides upon the said closure and a covering comprising platinum thereon.

8. A cathode in the form of a sleeve, closed at one end, a coating of barium-strontium oxides upon the said closure and a covering comprising spongy platinum thereon.

ANDREW STANIER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,936,419	Asao et al.	Nov. 21, 1933
2,103,033	Inman	Dec. 21, 1937
2,144,249	Allen	Jan. 17, 1939
2,147,447	Kolligs	Feb. 14, 1939
2,208,380	Lyle	July 16, 1940
2,227,017	Schlesinger	Dec. 31, 1940