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HOT CATHODE DISCHARGE TUBE

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Fig. 1

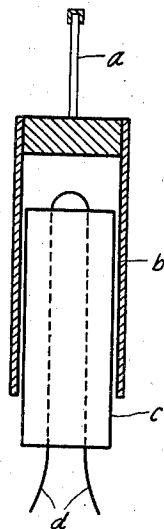


Fig. 2



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HOT CATHODE DISCHARGE TUBE

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2 Claims. (Cl. 250—27.5)

The object of the invention is a heated cathode or filament adapted to all purposes in which the chief desideratum is a practically punctiform and yet highly copious electron source, as used, for instance, in X-ray or Roentgen tubes, as well as in Braun or cathode ray tubes.

According to the prior art, tubes of the said sort customarily were equipped, in so far as a specially peaked or pointed source of electrons was required, with a looped cathode or else a cathode bent together to form a peak or point. Demerits of cathodes of this kind were that, owing to the large reduced curvature, that is, the radius of curvature at the point, breaks were frequent both during manufacture as well as during actual use, and further that frequently the lateral extension of the cathode made itself manifest by lack of focus or sharpness of the spot ascribable to electron emission from the lateral parts of the cathode.

These disadvantages, according to the present invention, are obviated by forming the electron-emissive portion of the cathode pin-shaped, and by heating the pin part by thermal conduction or radiation or both from the rest of the cathode. The heating of this particular part may be produced in various ways.

The two figures of the accompanying drawing illustrate two suitable embodiments of the invention without showing the tube in which the invention is to be embodied.

To refer specifically to the drawing, Fig. 1 shows an exemplified embodiment of the cathode according to the invention wherein *a* denotes a pin which at its point bears a layer consisting of alkali-earth oxide; *b* is a metallic cylinder which is incandesced by the filament *d*, the insulation body *c* serving for insulation. It will be understood that other dispositions may be obtained in a similar way. As shown in the modified arrangement of Fig. 2, the pin-shaped part *a* could also be heated directly from a heater wire *b* whose radius of curvature, as will be understood, may be chosen ad libitum. However, what should be kept in mind, no matter what particular form of construction is chosen, is that the heater or body, at the emission temperature of the pin, should send off no, or practically no, electrons.

Instead of coating the pin at its end or its posterior surface externally with a layer of alkaline-earth oxide, the said point could also be made hollow, while the bore is coated with the oxide of an alkali-earth material.

By the use of such a pin-shaped cathode in Braun tubes it will also be found easy to insure

a shape of spot that will be serviceable for any given practical purpose by that the cross-section of the emitting pin is chosen of suitable form. For television work, for instance, it is desirable, so as to insure gapless scanning or prevent overlapping, to use a quadratic spot. However, with the customary kind of cathode this has so far not been feasible. In a form of cathode according to this invention, quadratic shape is insurable by that the electron-emissive pin is made of identical cross-sectional shape; as a result, the cathode will result upon the fluorescent screen also in a square-shaped spot. It will be understood that it is in this manner also feasible to obtain whatever other form of spot may be desired.

In order that a small spot may be obtained it is fundamentally known in the prior art to provide special auxiliaries adapted to concentrate or focus the electron pencil issuing from the cathode such as a gas atmosphere, focusing cylinders and focusing coils. Particularly favorable results have been insured as regards the sharpness of focus of spot and the brightness of the latter, according to the invention, by utilizing such means as have been known in the earlier art, as stated, individually or in combination conjointly with a cathode as here disclosed.

It will be understood that this invention may be applied to any general tube arrangement of the type above mentioned and that the invention is, therefore, intended to include all modifications which fall fairly within the spirit and scope of this disclosure.

Having now described my invention, what I claim and desire to secure by Letters Patent is the following:

1. In an electron tube, a heater element, a sleeve surrounding the heater element and adapted to become heated thereby, a pin-like member attached to one end of the sleeve so as to become heated from the sleeve, and an electron emitting material supported only upon the end portion of the pin-like member remote from the sleeve member.

2. In an electron tube, a heater element, an electrically non-conducting insulating sleeve surrounding the heater element, and a pin-like member supported from the insulating sleeve so as to be heated thereby, said pin-like member having an electron emitting material supported only upon the end portion thereof which is remote from the insulating sleeve.

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