

Jan. 13, 1959

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GETTER STRUCTURE  
Filed Dec. 23, 1954

2,869,014

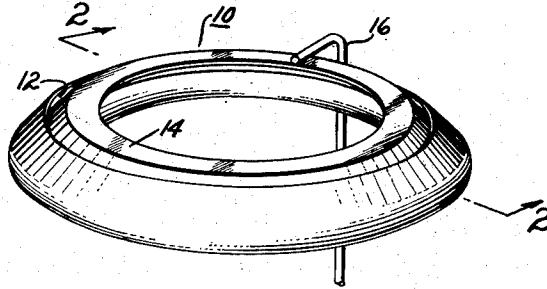


FIG. 1

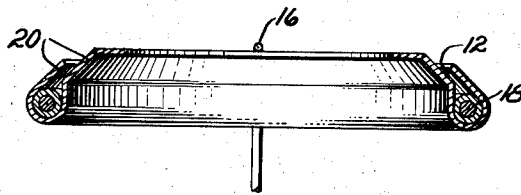


FIG. 2

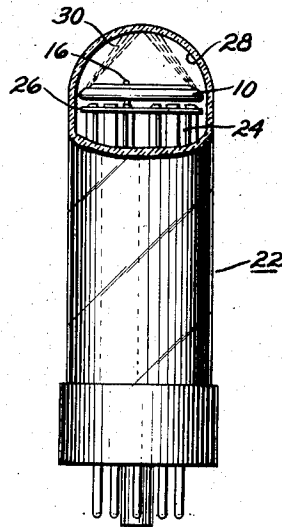


FIG. 3

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2,869,014

## GETTER STRUCTURE

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Application December 23, 1954, Serial No. 477,177

3 Claims. (Cl. 313—181)

This invention relates to a getter structure adapted to be used within an electron discharge device. More specifically, the invention concerns a getter structure adapted to direct the activation flash of getter material within a device so that the getter material is deposited upon a predetermined area of a surface therein.

Getter materials are used as clean-up agents within electron discharge devices such as electron tubes. During the usual mechanical evacuation of a tube envelope the getter material is heated to a temperature which is higher than that of its boiling point. The getter material volatilizes in what is known as a getter flash depositing getter material on surfaces within the tube.

It is an object of the invention to provide an improved getter structure for an electron discharge device for a more accurate control over the direction of a getter flash within the device.

It is another object of the invention to provide an improved getter of the ring type having a structure for more convenient support within an electron discharge device.

It is a further object of the invention to provide a relatively rugged ring-type getter structure.

It is yet another object of the invention to provide a ring-type getter structure for an electron tube which is adapted to exercise control over the direction of a getter flash within the tube and which has a relatively large space available for the accommodation of getter material within the structure.

It is a still further object of the invention to provide an electron tube having a ring-type getter which itself incorporates a structure that is adapted to be heated by induced radio frequency energy and which is effective to fully and desirable control the direction of a getter flash within the tube.

It is yet a further object of the invention to provide an improved electron tube having a getter structure adapted to direct a relatively large getter flash, induced by radio frequency energy, onto a relatively small area on an inside surface of the tube.

It is still another object of the invention to provide an improved electron tube having an envelope containing a plurality of electrodes and a ring-type getter structure having getter material therein and wherein the activation flash of getter material is directed by the getter structure toward portions of the inside surface of the envelope without depositing getter material on the electrodes.

According to the invention means are provided for attaining the foregoing objects.

While the invention is pointed out with particularity in the appended claims, it may be best understood from the following detailed description of an embodiment thereof taken in connection with the appended drawing wherein like numerals refer to like parts, and wherein:

Figure 1 is a perspective view showing a getter structure according to the invention;

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Figure 2 is a transverse sectional view taken on line 2—2 of Figure 1; and

Figure 3 is a side view partly in section of an electron tube having a getter structure embodying the invention.

Referring now to the drawing in greater detail there is shown in Figure 1 a getter structure 10 adapted to be used within an electron tube. The getter structure 10 includes a ring-shaped trough 12 having two wall portions thereof in relatively close proximity. The side of the getter trough adjacent to the center thereof is provided with a flange 14 having a relatively wide surface. The flange provides convenient means for engaging a support 16 for the mounting of the getter structure in a desired position within an electron tube. The relatively wide flange 14 also provides a path having a relatively large cross section for a relatively large magnitude of induced radio frequency energy. Thus the trough is adapted to be heated by the induced energy to a temperature sufficient to completely activate getter material contained therein.

As is shown in the sectional view of the getter structure shown in Figure 2, the trough 12 may have getter material 18 disposed therein. The getter material may, for example, be a wire of barium or of a barium alloy which has a protective sheath of aluminum to prevent the barium in the core material from reacting with the ordinary atmosphere. The aluminum sheath is consumed during the activation flash of the getter material. By adjusting the quantity of getter material within the trough, any desired amount of gettering or clean-up action may be provided within an electron tube. Thus, for example, a complete ring of getter wire may be provided within a given getter structure for cleaning up gases within a relatively large electron tube. The same getter structure may be provided with a relatively small amount of getter wire for use within a relatively small electron tube. Thus a single, standardized getter structure may be used for a variety of electron tube types wherein different amounts of gettering action are desirable.

The getter structure 10 may be made from any sheet metal stock. For example, a circularly shaped sheet metal body may be cut from the sheet metal stock. A circularly shaped structure is desirable since it proves more rugged and more easily heated by induced radio frequency energy than structures of other shapes.

A ring-shaped indentation is impressed into the sheet metal body adjacent to the periphery thereof to make a trough. The getter material, which may be in the form of a wire, is cut to whatever length is required and formed to fit the circular trough. After insertion in the trough the wire is enclosed by a bending of the outside wall of the trough inwardly toward the inside wall.

A center hole may be punched out of the sheet metal stock to form a ring-shaped structure in order to reduce capacity effects between the getter structure and electrodes within the tube. Also, a ring-shaped structure is better adapted to be heated by induced radio frequency energy for activation of the getter material.

The trough has walls defining two portions. One portion includes the bottom of the trough and serves to hold the getter material. The other portion extends to the mouth of the trough. The walls of the trough defining this last named portion define a relatively narrow annularly shaped outlet or passageway. As shown in the drawing the passageway referred to, which has a smaller transverse extent than the portion of the trough holding the getter material, is sloped in a desired direction so that the direction of the getter flash is controlled by the

opposing walls of the passageway. The getter structure in the drawing is provided with a passageway which is unimpeded by an inwardly oriented flange. The flange is inwardly oriented so as to be out of the way of the getter flash. Thus, the flange provides the getter structure with an increased path for induced radio frequency energy while preserving the flash from restraint. The passageway is substantially in the shape of a surface of a truncated portion of a right circular cone. The opposing walls of the passageway therefore direct the activation flash of the getter material toward the vertex of that cone.

While the getter structure has been described with respect to getter flashing by means of induced radio frequency heating it will be appreciated that other means for heating the getter structure may be employed.

Referring now to Figure 3, there is shown an electron tube 22 having a ring-type getter structure 19 of the kind shown in Figures 1 and 2. The getter structure is fixed, by means of the support 16, to an end of a mount or electrode assembly 24 within the tube. The tube 22 may have an electrode spacer plate 26 disposed between the getter structure 19 and the end of the mount 24 adjacent to the getter structure. The getter structure directs the flash of the getter material within the structure to a relatively small area on the inside surface of the tube envelope 23. The direction of the getter flash is indicated in the drawing by dotted lines 30. In practice the vapor pressure of the getter material (during the activation flash) will cause the opposing walls defining the passage to flare out. Thus, instead of the getter flash being directed to a point at the vertex of the cone, the getter flash will be directed toward an area of the envelope surface in the vicinity of the vertex. The deposition of the getter material on an area of the envelope surface, rather than at a point at the vertex, is desirable since it is the area of exposed getter material rather than the volume which determines the amount of gettering action available within the tube.

Thus it is seen that the getter structure of the invention may be advantageously used for directing a getter flash onto a relatively large area on an inside surface of an electron discharge device without depositing getter material on an electrode component of the device.

What is claimed is:

1. In an electron tube, an envelope, a getter structure within said envelope and comprising a hollow ring-shaped container having a trough portion and a flash directing portion, said trough portion having getter material therein, said flash directing portion having a smaller extent than said trough portion and including a pair of opposing walls in relatively close proximity defining an annularly shaped outlet passage converging from said trough portion substantially in the shape of a surface of a truncated portion of a cone, said envelope including a relatively small area portion at the vertex of said cone whereby portions of said getter flash passing through said passage are directed toward said relatively small area portion.

2. An electron tube comprising an envelope and a getter assembly supported within said envelope, said getter assembly including a getter material adapted to be ac-

tivated in a getter flash for gettering gases within said envelope, a substantially hollow ring-shaped container including a trough portion for supporting said getter material within said container, and a support arm fixed within said tube for supporting said container within said tube, said container having a flange for providing a surface for engaging said support arm for support thereon and being adapted to provide a path for increased reception of induced radio frequency current for activating said getter material while preserving the flash from restraint, said container including a pair of walls in relatively close proximity defining an annularly shaped passage converging from said trough portion substantially in the shape of a surface of a truncated portion of a cone, a portion of said envelope being disposed substantially at the vertex of said cone, said passageway having a smaller transverse extent than said trough portion, whereby a getter flash induced by the activation of said getter material is directed substantially along a surface defined by an extension of said truncated cone toward said envelope portion.

3. An electron tube comprising an envelope containing an electrode mount and a getter assembly; said getter assembly including a getter material adapted to be activated in a getter flash for gettering gases within said envelope, a substantially hollow ring-shaped container including a trough portion for supporting said getter material within said container, and a support arm fixed at one end thereof to said mount; said container having an annular flange for providing a surface for engaging the other end of said arm for support thereon and being adapted to provide a path for increased reception of induced radio frequency energy for activating said getter material while preserving the flash from restraint, said container including a pair of walls in relatively close proximity defining an annularly shaped inwardly sloped passageway substantially in the shape of a surface of a truncated portion of a right circular cone having said trough portion as the base and the vertex thereof substantially at a point on the inside surface of said envelope, said passageway having a smaller transverse extent than said trough portion, whereby a getter flash induced by the activation of said getter material is directed substantially along a surface defined by an extension of said truncated cone and onto an area of the inside surface of said envelope adjacent said vertex.

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