Oct. 27, 1936. J. HIRMANN 2,058,790

MOUNT FOR ELECTRON DISCHARGE DEVICES

Filed Nov. 11, 1933

FIG. 1

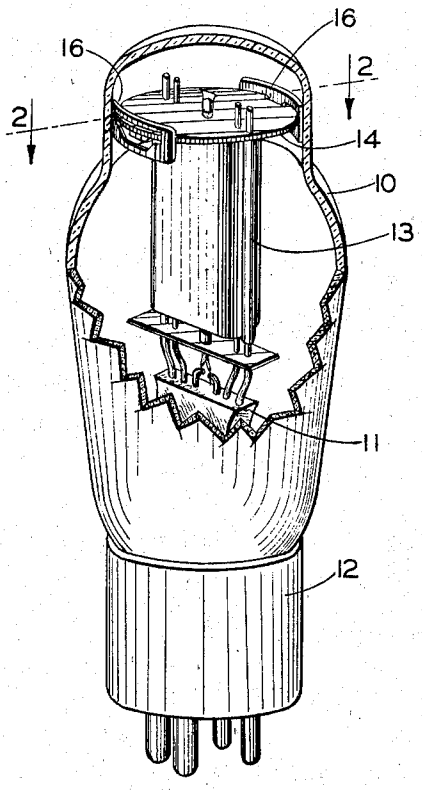


FIG. 2

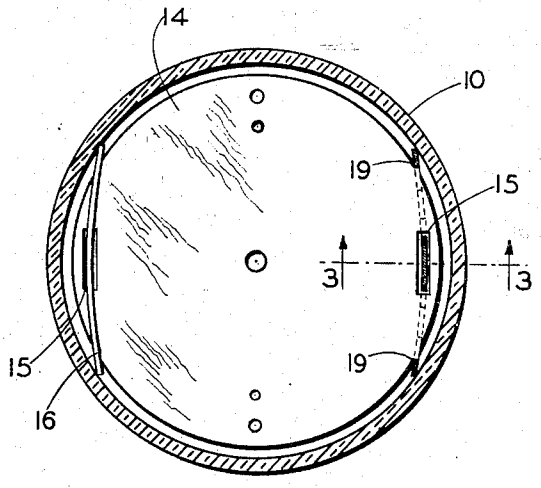


FIG. 3

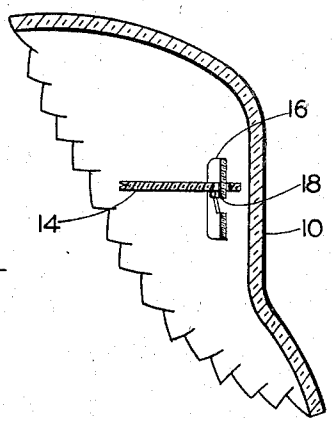


FIG. 4

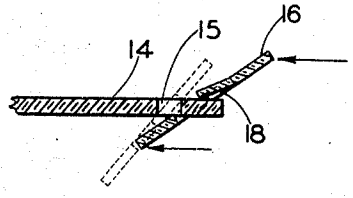


FIG. 5

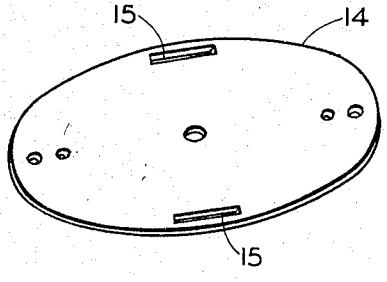
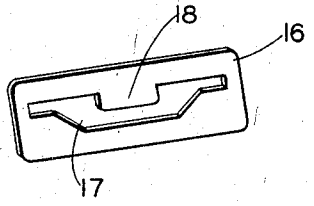


FIG. 6



INVENTOR
JULIUS HIRMANN.

BY Charles McClain
ATTORNEY

Patented Oct. 27, 1936

2,058,790

UNITED STATES PATENT OFFICE

2,058,790

MOUNT FOR ELECTRON DISCHARGE DEVICES

Julius Hirmann, Hillside, N. J., assignor to Radio Corporation of America, a corporation of Delaware

Application November 11, 1933, Serial No. 697,614

8 Claims. (Cl. 250—27.5)

My invention relates to improvements in electron discharge devices and more particularly to a mount construction by which the electrode assembly is firmly held in position in the envelope of the tube.

In radio tubes the electrode assembly should be supported so firmly that it cannot move transversely of the envelope. To this end the dome or constricted portion of the bulb used in tubes made with the dome type bulb is often utilized to steady the upper end of the electrode assembly and to prevent the electrode assembly vibrating transversely of the bulb. The electrode assembly should be steadied sufficiently to avoid noises, such as clicking, which may develop in operation and which are due to contact between the electrode assembly and the envelope when the tube is jarred or vibrated while in use. Attempts to steady the mount by metal braces which touch the bulb have not been successful as such braces tend to produce strain checks and cracks in the glass at points where the metal touches the glass.

The object of my invention is to steady a tube mount from the walls of the bulb by resilient spacers interposed between the mount and the walls of the bulb and of such a character that the walls of the bulb are not strained or injured when heated during manufacture of the tube.

The novel features which I believe to be characteristic of my invention are set forth with particularity in the appended claims, but the invention itself will best be understood by reference to the following description taken in connection with the accompanying drawing in which:

Figure 1 is a perspective view of an electron discharge device embodying my invention with part of the glass envelope broken away to show details of construction;

Figure 2 is an enlarged horizontal cross section taken along the line 2—2 of Figure 1;

Fig. 3 is a partial vertical section taken along the line 3—3 which is a transverse axis of the tubular dome portion of Figure 2;

Figure 4 illustrates how the top mica of a mount and a mica link type spacer made in accordance with my invention are assembled;

Figure 5 is a perspective view of a top mica suitable for use in accordance with my invention; and

Figure 6 is a perspective view of a link type mica spacer made in accordance with my invention.

The electron discharge device shown in Figure 1 has a dome type envelope or bulb 10 with the usual stem and press 11 and the usual base 12. The mount 13, comprising the electrode assembly and the supports by which the electrode assembly is carried on the stem, extends into the tubular portion or dome of the bulb 10. On the upper end of the mount is a sheet insulator, such as the top mica 14, shown as a circular disc, but which obviously could be of oblong, cruciform, or of some other shape. The top mica, which is rigidly fastened to the upper end of the mount and extends transversely of the mount, is of such a size that its edge is near the walls of the tubular portion or dome of the bulb 10.

The mount is steadied by resilient spacers which cooperate with the bulb and also with the mount. In the specific construction shown, the top mica 14, as best shown in Figures 2 and 5, has near its edges transverse slots 15 by means of which link type mica spacers 16 are interlocked with the top mica as indicated in Figure 4, and are set vertically and perpendicular to the top mica, as shown in Figures 1 and 3. The link spacers 16 are made of a resilient non-metallic material, such as sheet mica, which will not cause checking or cracking of the glass bulb when in contact with the glass. Each mica spacer 16 has a slot 17 of the shape best shown in Figure 6, and a tongue 18 which extends across the slot and is long enough to extend through the slots 15 in the top mica and lock the link spacer 16 in position on the top mica. The assembly of the link mica spacers on the top mica is carried out as indicated in Figure 4 by tilting the spacer 16 and sliding it over the top mica in the direction of the arrows until the tongue 18 enters the slot and interlocks the link spacer and the top mica.

The slot 17 is of such a width near each end that the link spacer makes an assembly fit with the top mica. The tongue 18 projects into the slot near the middle, and the slot is enlarged opposite the tongue to provide enough clearance to permit assembly of the link spacer on the top mica in the manner indicated in Figure 4. As a result of this construction the link spacer is so interlocked with the top mica that it will not drop off or be dislodged by the usual handling in the course of manufacture or by the handling incident to shipment of the tube.

In assembling the tube the bulb 10 is dropped down over the mount 13 until the top mica and the link spacers are in the position shown in Figures 1, 2, and 3. The link spacers 16 are preferably oblong and are of such a length that when the complete assembly is in place in the

bulb, as best shown in Figure 2, each link spacer bears on the edge of the top mica at two bearing points 19 and is slightly bowed at the middle, so that the ends of the spacers are resiliently pressed against the walls of the bulb with sufficient pressure to hold the upper end of the mount concentric with the dome and to prevent vibration of the mount or injury by the usual handling of the tube.

In a radio tube constructed as shown in Figure 1 and having a dome type bulb with a dome of about 1.43 inches inner diameter, and a top mica 14 about 15 thousandths of an inch thick and about 1.35 inches in diameter, I have obtained good results with link spacers 16 of sheet mica about 8 to 12 thousandths of an inch in thickness, about one quarter inch wide, and about 85 hundredths of an inch long. The distance from the middle point of the link spacer to each bearing point 19 of the spacer on the top mica is about three times the distance from the bearing point to the end of the spacer.

While I have indicated the preferred embodiments of my invention of which I am now aware and have also indicated only one specific application for which my invention may be employed, it will be apparent that my invention is by no means limited to the exact forms illustrated or the use indicated, but that many variations may be made in the particular structure used and the purpose for which it is employed without departing from the scope of my invention as set forth in the appended claims.

What is claimed as new is,—

1. An electron discharge device comprising a sealed envelope having a tubular portion, a mount enclosed by said envelope and comprising an electrode assembly positioned to be at least partly within said tubular portion, a sheet insulator secured to said mount to extend transversely of said tubular portion of said envelope, and at least one strip of resilient insulation supported by and set perpendicular to said sheet insulator with a portion intermediate its ends engaged by said sheet and its ends in contact with the walls of the tubular portion of said envelope to resiliently steady said mount from the walls of the tubular portion of said envelope.

2. An electron discharge device provided with a bulb having a tubular portion, a mount comprising an electrode assembly positioned in said bulb with one end inside said tubular portion, an outwardly extending sheet of insulating material secured to said one end to extend transversely of the tubular portion of said bulb, and oblong sheet mica spacers mounted perpendicularly to a transverse plane of said tubular portion with their ends in engagement with the walls of the tubular portion of said bulb and engaging said sheet of insulating material intermediate their ends to resiliently support said mount in a predetermined relation to the tubular portion of said bulb.

3. An electron discharge device provided with an envelope having a tubular portion, a mount comprising an electrode assembly supported in said envelope and extending within said tubular portion, a flat insulator secured to said mount to extend transversely of said tubular portion, spacers of resilient sheet insulation mounted on and set perpendicularly to said flat insulator spacer with their ends in contact with the walls of the tubular portion of said envelope to resiliently support the end of said mount in a predetermined position within said envelope, each of said spacers having a slot shaped to permit said spacer to be positioned on said flat insulator.

4. An electron discharge device provided with an envelope having a stem at one end and a tubular portion at the other end, a mount comprising an electrode assembly mounted on said stem to extend into said tubular portion, a top mica secured to said mount within the tubular portion of the envelope substantially perpendicular to the longitudinal axis of said tubular portion, and a pair of link mica spacers set perpendicularly to said top mica at diametrically opposite points and provided with slots for receiving said top mica, said mica spacers being set with their ends in engagement with the interior tubular portion of said envelope to resiliently support the end of the mount in a predetermined position within the tubular portion of said envelope.

5. An electron discharge device provided with an envelope having a tubular portion, a mount comprising an electrode assembly supported in said envelope and extending within said tubular portion, a top mica disc secured to said mount within the tubular portion of said envelope to extend transversely of said tubular portion, said top mica being provided with slots on opposite sides of the mount near the edge, sheet mica spacers set perpendicularly to the top mica and having slots for receiving the edges of said top mica adjacent the slots in said top mica disc, tongues on said mica spacers extended through the slots in said top mica for interlocking said top mica and said spacers, said spacers being in contact with the interior walls of the tubular portion of the envelope at their ends to resiliently maintain the mount centered in the tubular portion of the envelope.

6. Means for positioning the mount of an electron discharge device within an envelope provided with a tubular portion, including, in combination, a top mica disc adapted to be secured to the mount within the tubular portion of the envelope to extend transversely of the tubular portion, said top mica disc being provided near the edge with oppositely disposed slots, oblong sheet mica spacers set perpendicularly to the top mica disc, each having a longitudinal slot for receiving the edges of said top mica disc adjacent the slots in said top mica disc, and a transverse tongue for projecting thru the slots in the top mica disc to interlock said top mica disc and said spacers, said spacers being adapted to contact the inner walls of the tubular portion of the envelope at their ends to resiliently maintain the mount centered in the tubular portion of the envelope.

7. Means for positioning the mount of an electron discharge device within an envelope provided with a tubular portion, including in combination, a flat mica spacer adapted to be secured to the mount within the tubular portion of the envelope to extend transversely of the tubular portion and having slots near opposite edges, sheet mica spacers set perpendicularly to the top mica spacer and each having a slot for receiving the edge of said flat mica spacer, and a tongue extending thru the slots in the flat mica spacer for interlocking said flat mica spacer and said sheet mica spacers, said sheet mica spacers being adapted to contact at their ends the interior wall of the tubular portion of the envelope to resiliently maintain the mount centered in the tubular portion of the envelope.

8. Means for positioning the mount on an elec-

tron discharge device within an envelope provided with a tubular portion, including in combination, a flat mica spacer adapted to be secured to the mount within the tubular portion of said envelope to extend transversely of the tubular portion of the envelope and provided with slots adjacent opposite edges, sheet mica spacers set perpendicularly to said flat mica spacer and provided intermediate their ends with tongues which extend thru said slots to hold in position on said flat mica spacer said sheet mica spacers, said sheet mica spacers being adapted to engage the interior walls of the tubular portion of the envelope at their ends to resiliently support the mount in a predetermined position within the tubular portion of the envelope.

JULIUS HIRMANN.