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A. I. CRAWFORD
ELECTRON DISCHARGE DEVICE
Filed April 26, 1928

1,880,833

FIG. 1.

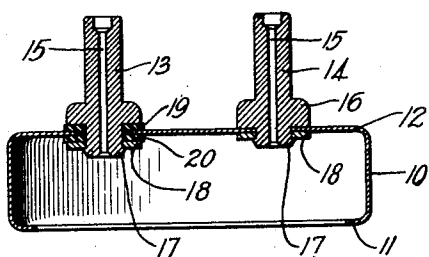


FIG. 3.

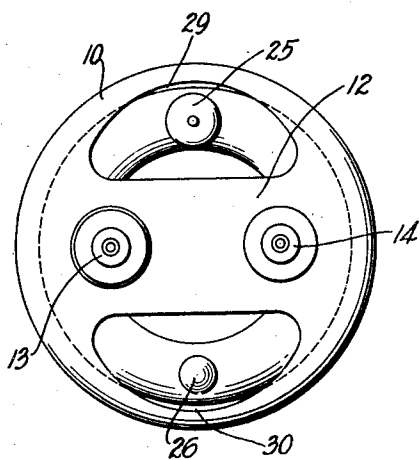
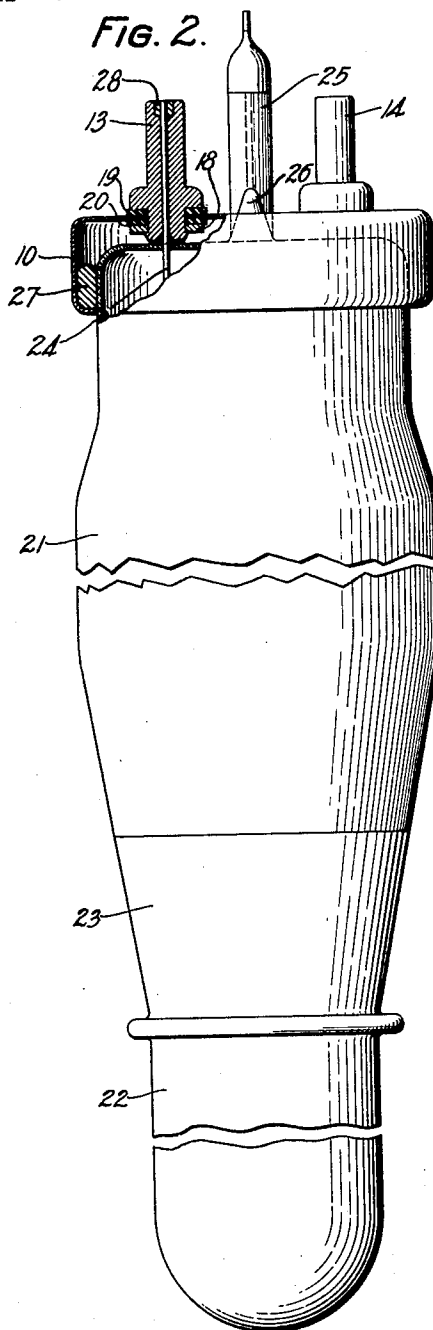


FIG. 2.



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ELECTRON DISCHARGE DEVICE

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This invention relates to electron discharge devices and more particularly to such devices capable of handling large amounts of power.

on an electron discharge device of the external anode type with a portion cut away to show the detailed assembly; and

Fig. 3 is a plan view of the base end of the discharge device shown in Fig. 2, showing the arrangement of the glass extensions projecting through the apertures in the base portion.

Referring to the drawing, the improved terminal base comprises a cylindrical shell portion 10, preferably of metal, having one edge 11 turned inwardly to engage the glass portion of the discharge device to be hereinafter described. The shell 10 is provided with a bridging portion or member 12 on which the terminal pins 13 and 14 are supported. These pins are formed of metal and are provided with an opening 15, which extends through the axis of the pins. Each of the pins is provided with a shoulder 16 adjacent the bridging portion 12 of the shell base and is attached to the bridging member 12 by spinning the edge 17 over a metallic washer 18 within the shell base. The terminal pin 13 is insulated from the metallic bridging member 12 by insulating washers 19 and 20, whereas the terminal pin 14 is mechanically and electrically connected to the bridging member 12. In Fig. 2 the metallic base 10 is shown attached to the glass portion of the discharge device which is of the general type disclosed in Patent 1,647,617, dated November 1, 1927, to T. R. Griffith, and comprises an enclosing vessel having a glass portion 21 and a metallic portion 22 joined together at the tapered end 23 of the metallic portion in accordance with the method disclosed in W. G. Houskeeper Patent 1,294,466, dated February 18, 1919. In this type of discharge device the metallic portion 22 acts as the external anode of the discharge device and the other electrodes, for instance, the cathode and control electrode or grid are enclosed within the vessel and arranged in operative relation with respect to the external anode 22. The internal electrodes are supported from a stem in the vessel and the leading-in wires for the cathode project from the end of the glass portion 21, as shown at 24. The control electrode or

An object of the invention is to improve the terminal base for high power electron discharge devices.

Another object is to reduce the length of the long evacuated tube projecting from the discharge device and still provide a sufficient insulating path between the terminals of the electrodes in the device.

In accordance with this invention the improved base for high power discharge devices comprises a cup-shaped metallic casing of small height and having two large symmetrical cut-out portions in the bottom thereof through which the grid leading-in tube and the sealing point of the vessel may project. The base may be readily affixed to the end of the vessel without danger of breaking the sealed glass portions. Due to the reduction in the height of the metallic base, the grid leading-in tube may be correspondingly shortened without sacrificing the length of the insulating path between the terminals. Furthermore, the large air space provided by the cut-out portions of the base increases the insulating path between the electrode terminals.

A feature of the invention relates to the arrangement of the filament terminals on the improved base. This consists in mechanically and electrically attaching one of the filament terminals to the metallic base, to reduce the capacity effect between one end of the filament and the metallic base and insulating the other filament terminal from the base. These terminals are attached to a bridging portion on the base between the symmetrical cut-out portions. This construction considerably reduces the cost of manufacture and assembly.

A more detailed description of the invention follows and is illustrated in the accompanying drawing in which:

Fig. 1 is a sectional view of the improved base for electron discharge devices made in accordance with this invention;

Fig. 2 illustrates the assembly of the base

grid is provided with a leading-in wire which is enclosed in a tubular glass extension 25 located on the rim of the glass vessel 21 and projects a considerable distance beyond the rim of the vessel. The enclosing vessel is evacuated through a glass extension 26 which is sealed off after the completion of the evacuation process.

Heretofore, it has been the practice to provide a relatively high base to afford protection for the tube 25 projecting from the end of the vessel. However, such a base did not offer sufficient insulation resistance between the grid leading-in wire enclosed in the tube 25 and the filament terminals supported on the base portion. This difficulty is overcome in accordance with this invention by providing a metallic base of relatively short height whereby the tube 25 may be considerably shortened and still provide a sufficient insulating path between the grid leading-in wire in the tube 25 and the filament terminals on the base. The shell base 10 is arranged on the end of the glass portion 21 and is fastened thereto by an annular ring of adhesive cement 27 with the filament leading-in wires extending through the apertures 15 in the terminal pins 13 and 14. These leading-in wires are sealed to the terminal pins by filling the end of the pin with solder as shown at 28. As shown in Fig. 3, the base 10 may be formed into a cup-shaped shell from a single piece of sheet metal and provided with two symmetrical semi-circular cut-out portions 29 and 30 in the closed end of the shell. The glass extensions 25 and 26 project through the cut-out portions which form air spaces of high resistance between the grid leading-in wire and the filament terminals. This arrangement considerably reduces the length of the grid leading-in wire tube 25 while increasing the insulation resistance between the grid leading-in wire and the filament terminals arranged on the bridging member 12. Another advantage of this improved type of base is the facility with which the metallic base may be attached to the enclosing vessel without endangering the glass projections extending from the rim of the glass portion of the vessel. The arrangement as shown in Fig. 1 in which one of the terminal pins is mechanically and electrically in contact with the metallic shell base 10 provides a means of overcoming the capacity effect between one end of the filament and the metallic shell base.

The above description relates to a particular embodiment of the invention which may be modified in various ways with respect to the material used and the shape of the openings through which the glass portions of the vessel extend without departing from the scope of the invention as defined in the appended claims.

What is claimed is:

1. A base for electron discharge devices comprising a shell having openings at either end, said shell having an integral bridging portion extending across one of said openings with air insulating passages on either side thereof, and terminals carried by said bridging portion.

2. A base for electron discharge devices comprising a metallic shell having openings at either end, a metallic bridging portion having parallel edges extending across one of said openings, and terminals carried by said bridging portion.

3. A base for electron discharge devices comprising a metallic shell having openings at either end, said shell having a metallic bridging member extending across one of said openings, and terminals carried by said bridging member, one of said terminals being mechanically and electrically connected to said member.

4. A base for electron discharge devices comprising a cup-shaped metallic shell having two symmetrical cut-out portions therein, and a pair of terminals extending from said shell and located between said cut-out portions.

5. A base for electron discharge devices comprising a cup-shaped metallic shell having two symmetrical semi-circular openings therein, and a pair of terminals extending from said shell and located between said openings.

6. In combination, an electron discharge device comprising a vessel having leading-in wires for the electrodes projecting from one end thereof, one of said leading-in wires being enclosed in an evacuated tube, and an apertured base attached to said vessel and carrying terminals for some of said leading-in wires, said evacuated tube projecting through said base and having an insulating air space separating said tube from said base.

7. In combination, an electron discharge device comprising an enclosing vessel having glass terminations projecting from one end thereof, and a cup-shaped metallic base attached to one end of said vessel and having apertures through which said glass terminations extend, said base being completely out of contact with said glass terminations.

8. In combination, an electron discharge device comprising an enclosing vessel, leading-in wires for electrodes extending from said vessel, one of said wires being enclosed in an evacuated tube projecting from the end of said vessel, a metallic shell base attached to said vessel, said base having a semi-circular opening through which said evacuated tube extends, and terminals for other leading-in wires from said vessel carried by said base adjacent said opening.

9. In combination, an electron discharge device comprising an enclosing vessel hav-

ing glass terminations projecting from one
end thereof, and a base attached to said vessel,
said base having apertures through which
said glass terminations extend, the cross-
sectional areas of said apertures being greater
5 than the cross-sectional areas of said glass
terminations so as to provide air spaces com-
pletely surrounding said glass terminations.

In witness whereof, I hereunto subscribe
10 my name this 19th day of April, 1928.

ALLEN I. CRAWFORD.

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