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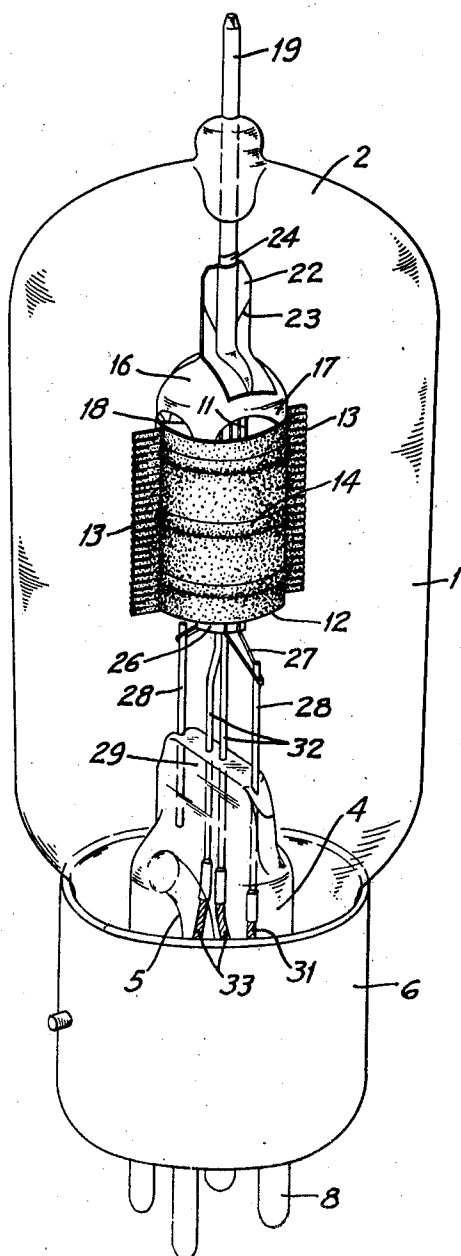
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ELECTRONIC TUBE

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2 Sheets-Sheet 1

Fig. 1



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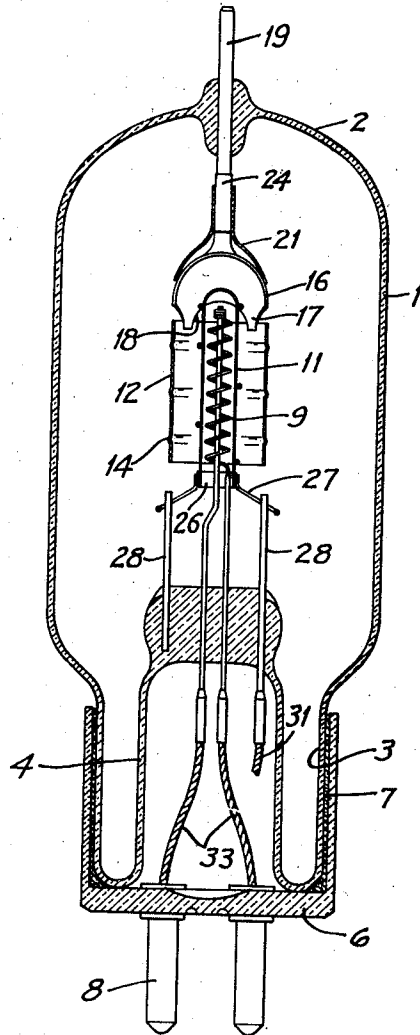
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Fig. 2



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ELECTRONIC TUBE

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6 Claims. (Cl. 250—27.5)

Our invention relates to an electronic tube particularly adapted for transmission purposes.

It is among the objects of our invention to provide an improved structure of, arrangement for and mounting of the electrodes and leads in the envelope.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of our invention. It is to be understood that we do not limit ourselves to this disclosure of species of our invention, as we may adopt variant embodiments thereof within the scope of the claims.

Referring to the drawings:

Figure 1 is a perspective view of a tube embodying the improvements of our invention; and Figure 2 is a vertical sectional view of the same.

In terms of broad inclusion, our tube comprises an envelope having a re-entrant stem at one end. A plurality of coaxial electrodes including a plate and grid and cathode are arranged in the envelope, the plate being provided with a cap at one end thereof. The plate is supported by a bracket on the cap secured to a lead disposed coaxially with the electrodes and sealed to the envelope end opposite the stem. Leads for the grid and cathode are sealed to the stem.

In greater detail, and referring to the drawings, our tube comprises an envelope of glass or the like having a cylindrical body 1 terminating at the top in a dome 2 and at the bottom in a reduced neck 3 carrying a re-entrant stem 4 having an exhaust tubulation 5. The envelope is fitted with a cup-shaped base 6, say of porcelain, secured to neck 3 by a suitable cement 7. Prongs 8 of the usual type project from the base.

Within the envelope are arranged a plurality of electrodes including a cathode 9, grid 11 and plate or anode 12. The plate is cylindrical in shape, and may be of any suitable metal, such as tantalum. It preferably comprises a pair of half-cylinder sections with flanges welded together to form heat radiating fins 13. Annular beads 14 in the sections hold their shape when formed in a die. After welding, the fins are corrugated.

A hemispherical cap 16 of tantalum is secured over the upper end of the tubular plate by depending tabs 17 welded to the rim. Arched recesses 18 formed in the cap between tabs 17 provide vent openings. This cap protects the glass dome against electron bombardment, and also

adds to the heat radiating surface of the plate structure.

Plate lead 19, preferably of tungsten, is arranged coaxially with the electrodes and projects through dome 2 at seal 20. The plate is supported by a bracket 21 welded at the lower end to cap 16 and at the upper end to lead 19. This bracket preferably comprises a pair of tantalum straps shaped with curved feet at the bottom to fit the cap for convenience in welding. The up-standing ends of the straps are grooved to embrace the lead, with laterally projecting portions providing heat radiating fins 22 extending along the lead.

One of the problems in tubes is to prevent heat from flowing out to the glass and cracking the seal. Our structure overcomes this difficulty by reason of the mounting structure above described. As already mentioned, end cap 16 stops electron bombardment of the glass, and helps to dissipate heat by radiation before it reaches lead 19. Fins 22 on the bracket also function to dissipate heat tending to flow out along the lead. Angularly disposed slits 23 in fins 22 serve to retard outward flow of heat by conduction. These features, together with the fact that tantalum is not a good heat conductor, cooperate to thermally isolate the plate lead and its seal from the heat zone at the electrodes.

Another feature of the plate mounting structure is that a nickel sleeve 24 is interposed between tungsten lead 19 and the tantalum bracket. Nickel alloys or fluxes readily with both tungsten and tantalum, insuring a good welded joint between the parts. Furthermore, the weld is clean and free of oxides and contamination which, if present, make outgassing difficult during evacuation.

Grid 11 is of the cage type, preferably of platinum wire, terminating in a tantalum base ring 26. This electrode is supported by brackets 27 on a pair of tungsten rods 28 sealed in a press 29 on stem 4. Each bracket comprises a hairpin-shaped tantalum wire welded at the ends to grid ring 26 and at the bight to a rod 28. One of the supporting rods 28 serves as a lead and is connected by a flexible extension lead 31 to a base prong 8.

Filamentary cathode 9 comprises a coil of thoriated tungsten welded at top and bottom to a pair of tungsten leads 32 sealed to the stem. The cathode leads are disposed intermediate the grid leads, all lying in a common plane passing through the axis of the electrodes. Flexible ex-

tensions 33 connect the lower ends of leads 32 with a pair of base prongs 8.

A rectifier tube may be made in accordance with the above structure by omitting the grid, in which case the cathode only is supported from the stem.

We claim:

1. An electronic tube comprising an envelope having a re-entrant stem at one end thereof, a plurality of electrodes including a plate and grid in the envelope, a lead sealed to the other end of the envelope, a cap on one end of the plate, means on the cap for supporting the plate on said lead, a lead sealed to the stem, and means supporting the grid on the last mentioned lead.

2. An electronic tube comprising an envelope having a re-entrant stem at one end thereof, a plurality of coaxial electrodes including a plate and grid in the envelope, a lead coaxial with the electrodes and sealed to the other end of the envelope, a cap on one end of the plate, means on the cap for supporting the plate on said lead, a lead sealed to the stem, and means supporting the grid on the last mentioned lead.

3. An electronic tube comprising an envelope having a re-entrant stem at one end thereof, a plurality of electrodes including a plate and grid and cathode in the envelope, a lead sealed to the other end of the envelope, a cap on one end of

the plate, means on the cap for supporting the plate on said lead, a lead sealed to the stem, means supporting the grid on the last mentioned lead, and leads for the cathode sealed to said stem.

4. An electronic tube comprising an envelope having a re-entrant stem at one end thereof, a plurality of electrodes including a plate and cathode in the envelope, a lead sealed to the other end of the envelope, a cap on one end of the plate, means on the cap for supporting the plate on said lead, and leads for the cathode sealed to the stem.

5. An electronic tube comprising an envelope, an electrode in the envelope, a tungsten lead sealed to the envelope, a tantalum bracket secured at one end to the electrode and welded at the other end to the lead, and a nickel sleeve interposed between the bracket and lead at the weld.

6. An electronic tube comprising an envelope, a grid in the envelope terminating in a ring, a lead projecting into the envelope, and a support for the grid comprising a hairpin-shaped wire having its ends secured to said ring and the bight secured to said lead.

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