Jan. 10, 1928. 1,655,820

G. H. PERRYMAN

VACUUM TUBE

Filed May 22, 1926

Fig. 1.

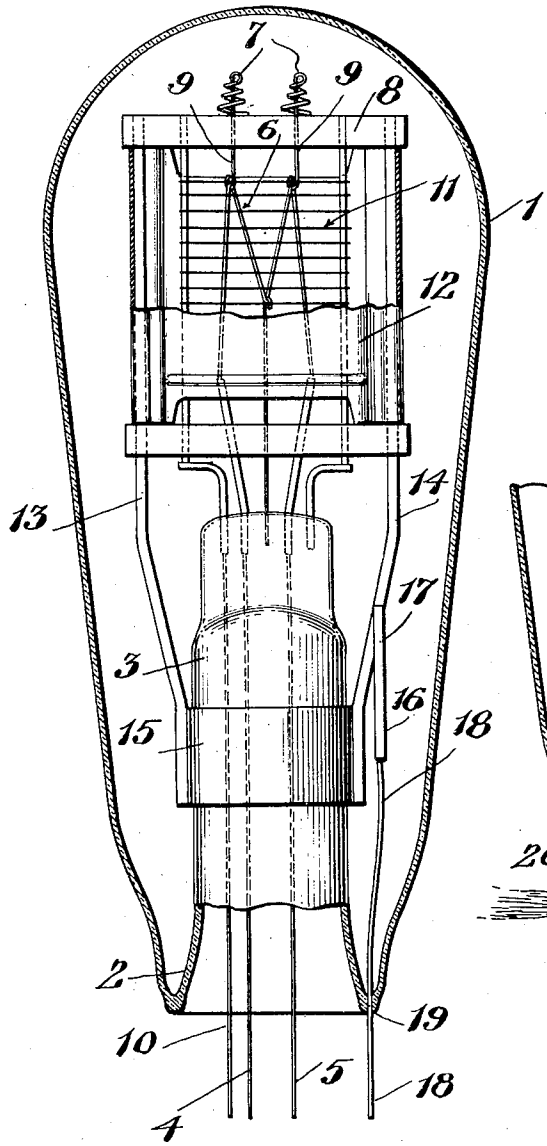
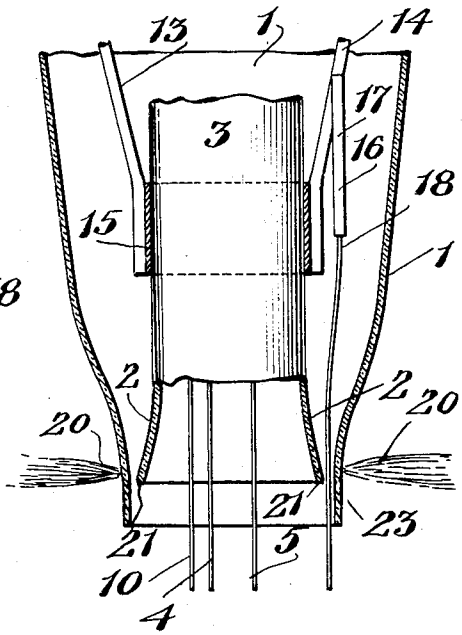


Fig. 2.



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VACUUM TUBE.

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This invention relates to a vacuum tube or thermionic device and has for its object to provide such a device with a high voltage lead-in wire so arranged that the possibility of short circuit between said wire and the other lead-in wires is prevented. It is well known that in tubes of the type known as "power amplifier tubes" the lead-in wire supplying voltage to the anode or plate carries a high voltage amounting in some instances to as much as 500 volts. It is therefore desirable that this lead be spaced as far as possible from the filament lead-in wires which carry a low voltage. It is also desirable that where possible, the greatest amount of insulating material or glass be placed between the high voltage lead-in wire and the other lead-in wires.

The primary object therefore of my invention is to provide a high voltage lead-in wire so located that the desirable results mentioned above will be attained and said lead-in wire may be properly positioned during the ordinary manufacture of the tube without entailing extra operations or labor.

Referring to the accompanying drawings

Figure 1 is a sectional view of my improved vacuum tube with parts being broken away and the tube base omitted to disclose construction; and

Figure 2 is a sectional view of the lower part of the tube in the process of being manufactured and showing the envelope or casing being fused to the flare of the stem.

Throughout the various views of the drawings, similar reference characters designate similar parts.

In the embodiment of my invention disclosed in the accompanying drawing, 1 indicates the outer envelope or glass casing of the tube which is, in the process of manufacture fused to the lower end or flare 2 of the glass stem 3. Passing through the stem 3 are the filament lead-in wires 4 and 5 which extend upward and support the filament 6. The filament is resiliently supported also by means of the springs 7 which rest upon a cross-brace 8 and have hooked ends 9 which engage with the filament.

At 10 is the lead-in to the grid which is shown at 11. The plate or anode is shown at 12 and this is supported upon rods 13 and 14 which are secured at their lower ends to a band or strap 15 which surrounds the stem 3.

At 16 is the lead-in wire which supplies the plate voltage and said lead-in wire comprises a thick or rigid upper part 17 which is fused to the rod 14. Extending from the part 17 is a thinner or lighter wire 18 which runs substantially parallel to the stem 3 and passes out of the tube shell at the juncture 19 of the outer envelope and stem flare 2.

It will be seen from the foregoing that the position of the lead-in wire 16 is such that it is spaced at a considerable distance away from the other lead-in wires 4, 5 and 10 and as it is completely outside of the glass stem 3, while the other wires are contained within the same, an amount of insulating material or glass is interposed between said wire 16 and the other lead-in wires 4, 5 and 10.

The method of manufacturing the tube, as far as the sealing-in operation of the wire 16 is concerned, is diagrammatically illustrated in Figure 2. The stem with the attached tube parts is held on a suitable support (not shown) and preferably in a vertical position. The glass envelope 1 is placed over the same and heat is applied to the lower end of the envelope 1 as is indicated at 20 in Figure 2.

The lead-in wire normally extends downward and it positions itself between the edge 21 of the flare 2 on the stem and the lower part 23 of the envelope so that when the heat 20 is applied and the stem 3 and envelope 1 are fused together, the wire 16 is effectively sealed in at the juncture of the flare 2 and envelope 1 as will be clearly seen in Figure 1. Since the joining together of the stem 3 and outer envelope 1 of the tube is a normal operation in tube manufacture, it will be seen that no extra steps, with consequent extra expense are required. At the same time, the lead-in wire is rigidly held and is effectively spaced from the other lead-in wires, which in tubes of the character herein described, is very desirable.

It will be seen in Figure 2 that the envelope is, before it is sealed to the stem 3, of greater length than is actually required, so that the lower skirt portion part 23 of said envelope is dependent below the lower termination on the stem 3. The act of sealing together the flare 2 on the stem 3 and the lower end of the envelope unites these with the lead-in wire 18 between them and simultaneously serves to remove the excess glass

on the end of the envelope, said excess glass dropping off, leaving the tube in the condition disclosed in Figure 1.

Having described my invention, what I claim is:

The process of making a vacuum tube consisting in surrounding a tube stem with an envelope so that a lower dependent skirt portion on said envelope will be caused to project a considerable distance below the lower termination of the stem, in placing a high voltage lead-in wire extending from the tube anode between the edges of the stem and the dependent skirt portion, in fusing together the edges of the stem and the dependent skirt on the envelope so that the lead-in wire is sealed in said joint and in simultaneously removing excess glass from the dependent envelope skirt during the fusing operation.

Signed at the city, county and State of New York, this 11th day of May, 1926.

G. H. PERRYMAN.