March 25, 1958 L. FRENKEL 2,828,433

ELECTRON GUN CONSTRUCTION

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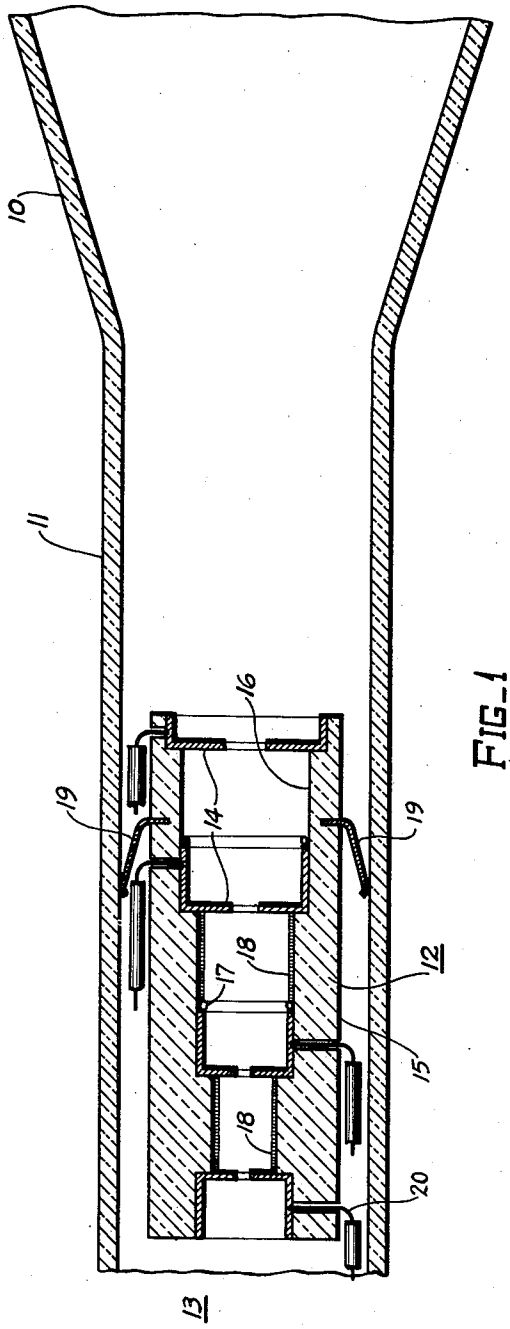


FIG. 1

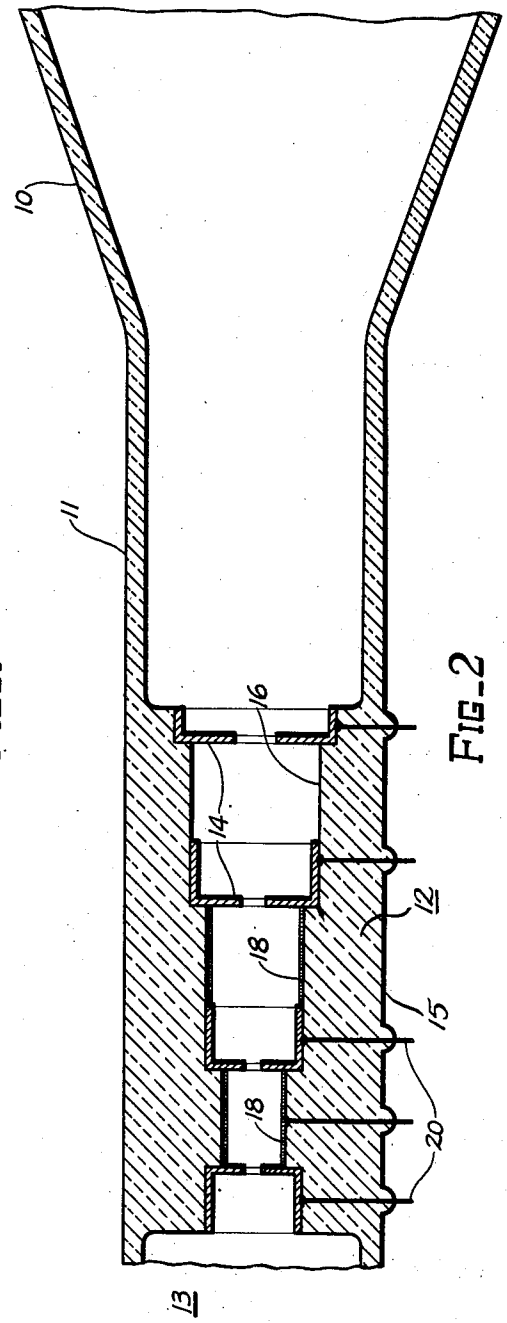


FIG. 2

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ELECTRON GUN CONSTRUCTION

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1 Claim. (Cl. 313—82)

This invention relates generally to cathode ray tubes and more particularly to an electron gun construction for such cathode ray tubes.

Various types of gun constructions are known in which a plurality of substantially cylindrical electrodes and apertured disk electrodes are aligned in spaced apart relation along a generally longitudinal axis of a cathode ray tube. In the prior art devices it has been necessary to mechanically join together a network of bridging to support the electrodes and also to insulate the electrodes one from the other spacing them at the same time from the glass envelope of the tube. This has previously been accomplished by utilization of wire-like bridging carrying ceramic or glass-like sleeves or utilizing glass or ceramic rods to actually carry or space one element from the other. The conventional gun construction described, entails considerable detail of spot welding, sleeving or melting of insulators and fusing them to metallic parts. The prior art, therefore, required rather detailed and laborious techniques in construction of such electron guns all of which was rather time consuming and required highly skilled personnel in assembly thereof.

These disadvantages are overcome by the present invention. The invention includes an electron gun construction wherein an insulating member of a substantially cylindrical shape may be utilized to selectively encompass and house electrodes in predetermined desired shaped and spaced relationships. It is thereby possible to utilize the services of a relatively unskilled person to assemble the electron gun within the insulating member and maintain a very high degree of assembly accuracy.

It is an object of this invention to provide an electron gun construction which may be readily assembled by relatively unskilled workers.

It is another object of this invention to provide an electron gun construction which may be easily preformed to desired internal configurations which configurations may be utilized to encompass, carry or house desired electrodes.

It is another object of this invention to provide an electron gun construction wherein certain of the electrodes may be housed and carried by predetermined configurations therein.

It is another object of this invention to provide an electron gun construction wherein certain of the electrodes may be deposited upon the internal surfaces of a preshaped insulating member.

It is another object of this invention to provide an electron gun construction which may be made integral or conterminous with the cathode ray tube.

It is another object of this invention to provide an

electron gun construction whose outer surfaces have a co-efficient of expansion similar to that of the tube.

Other objects and advantages than those set forth will be apparent from the following description when read in connection with the accompanying drawings, in which:

Figure 1 is a view in cross-section of a portion of a cathode ray tube embodying the invention;

Figure 2 is a view in cross-section of a portion of a cathode ray tube showing an additional embodiment of the present invention.

Referring more particularly to Figure 1, a cathode ray tube **10** having an envelope **11**, of any known construction such as glass, ceramic or metal, has positioned therein, at a beam generating portion thereof, an electron gun construction **13**. The electron gun construction **13** includes a generally cylindrically shaped insulating member **12** having a substantially annularly shaped cross section. Member **12** may be made of any known insulating material such as glass, ceramic or the like, and may be provided with an outer surface **15** and an inner surface **16**. The outer surface **15** of the member **12** may be of a circumference such that the member **12** will fit snugly adjacent the internal diameter of the envelope **11** of the tube **10**, or of a circumference such that it may be supported by clips **19** in spaced relation to the envelope **11** as is shown in Figure 1. It should also be understood that thte invention includes other methods of spacing the member **12** from the internal surface of envelope **11** as are known in the art.

It is also within the contemplation of this invention to have member **12** provided with the outer surface **15** of predetermined circumference such as to be conterminous with the tube circumferential dimension, as is shown in Figure 2. In this manner the insulating member **12** may be sealed directly to the tube envelope **11**, that is, a glass to glass, or glass to ceramic or metal to glass seal may be effected. Such a construction could utilize in addition, any compatible materials having like co-efficients of expansion. The internal surface **16** of member **12** may be shaped in any predetermined desired shape to house, for example, any predetermined shaped electrodes **14**. The outer periphery of the electrodes **14** will determine the complementary desired configuration of the corresponding inner surface **16** which will house electrodes **14**. As is well known in the art, the electrodes **14** may be held in position by use of well known lock rings or retainers **17**.

It is also within the purview of this invention to utilize the inner surface **16** as a base for depositing thereon metallic or like coatings **18** to be utilized as accelerating electrodes. Any well known printed circuit technique may be utilized to deposit coating **18** to form desired anodes upon the internal surfaces **16** of member **12**. Leads **20**, to the deisred electrodes, may be brought through member **12**, such as by embedding of conductors therein or utilizing well known conductive paints to form leads **20**, and directed to any desired position on or along the tube.

The particular embodiment of the invention illustrated and described herein is illustrative only and the invention includes such other modifications and equivalents as may readily appear to those skilled in the art within the scope of the appended claim.

I claim:

An electron gun construction, including electrodes, for utilization in a cathode ray tube, said gun comprising a

cylindrical insulating member being unitary with the envelope of said cathode ray tube and comprising a substantially uninterrupted unitary structure, said member having an outer surface, and an inner surface, said outer surface being the outer surface of said cathode ray tube envelope, said inner surface being generally cylindrical shaped with varying diameters to selectively encompass, carry and house said electrodes, and said inner surface being formed into a plurality of configurations spaced along said member, said configurations complementing said electrodes.

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