March 5, 1946. S. J. KOCH ET AL 2,396,014

ELECTRON GUN STRUCTURE

Filed Oct. 30, 1943

Fig. 3

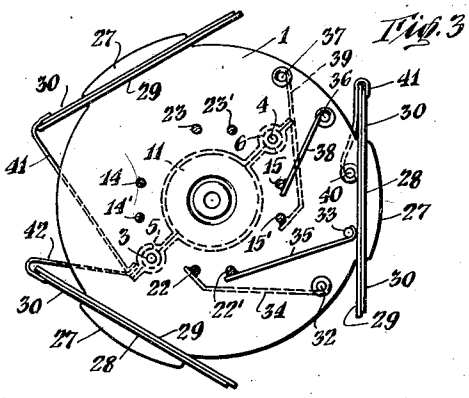


Fig. 4

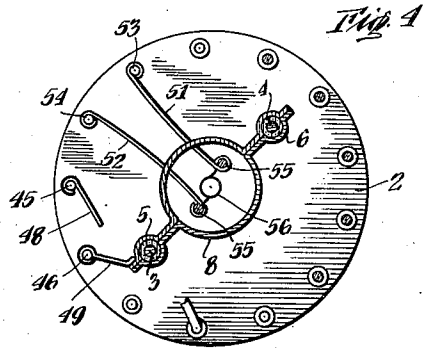


Fig. 1

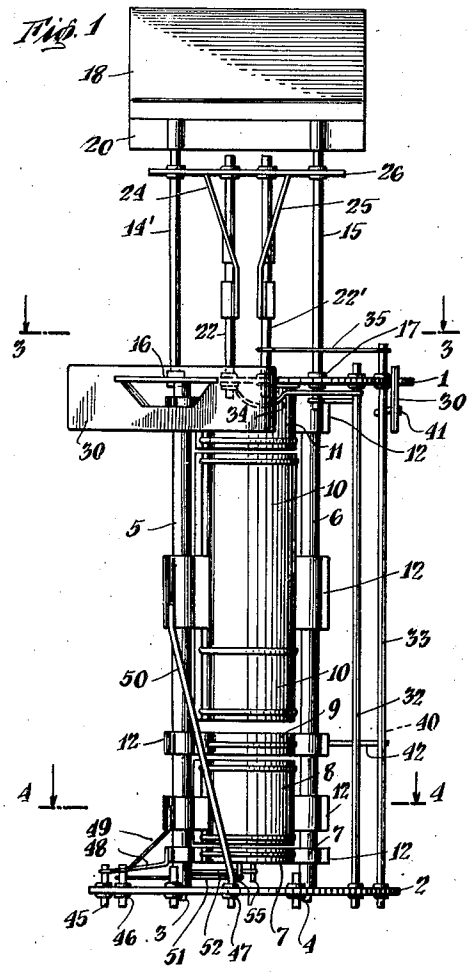
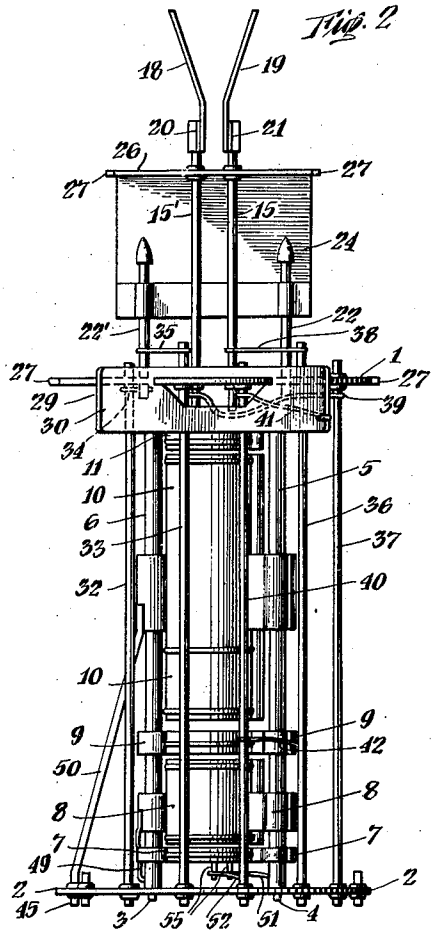


Fig. 2



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ELECTRON GUN STRUCTURE

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19 Claims. (Cl. 250—158)

This invention relates to an electron gun and particularly to the way the electrical connections to the electrodes thereof are made. In carrying out the invention, electrical connection is made to one pair of deflecting plates through two pairs of spaced conductors mounted in insulating discs and to the other pair of such plates through two other pairs of spaced conductors spaced from the first pair. The conductors are spaced sufficiently far apart to avoid danger of leakage between the conductors. A support through which potential is applied to the grid of the gun is mounted in the insulating discs. It is located between said pairs of supports, and provision is made for applying potentials to these and other electrodes of the gun in such a way that the danger of arcs or leakage is minimized.

The invention may be understood from the description in connection with the accompanying drawing, in which:

Fig. 1 is a side view;

Fig. 2 is a side view at right angles to Fig. 1;

Fig. 3 is a section along the line 3—3 of Fig. 1; and

Fig. 4 is a section along the line 4—4 of Fig. 1.

In the drawing, reference characters 1 and 2 indicate mica discs, and reference characters 3 and 4 indicate metal rods connected near their ends to said discs. Tubes 5 and 6 of ceramic material surround said rods between said discs. A cathode support 7, a grid 8, a pre-accelerating anode 9, a first anode 10, and a second anode 11 are connected by extensions or straps 12 that are integral with the elements 7 to 11 on opposite sides thereof so that they may be attached in fixed positions to the tubes 5 and 6 and properly spaced from each other.

Pairs of metal rod supports 14, 14' and 15, 15' are anchored in eyelets 16 and 17 (Fig. 1) located in holes through a mica disc 1 with their upper ends rigidly secured to the lower edges of deflection plates 18 and 19 by metal straps 20 and 21 spot-welded to these plates. Similar pairs of shorter metal rods 22, 22' and 23, 23' are anchored in the disc 1 in the same way to support a pair of deflection plates 24, 25 in like manner. The pairs of supporting rods 14, 14', 15, 15', 22, 22', and 23, 23' have their upper ends anchored in metal eyelets fixed in place in the mica disc 26 which is smaller than disc 21.

Discs 1 and 26 have spaced projections 27 with slots 28 therethrough for receiving anchoring projections that are on thin mica strips 29 and similar thin spring steel strips 30 in the known way to keep these strips in place so that the ends thereof will be pressed against the layer of conducting material that is provided on the inside surface of the neck of the glass tube in which the device is to be installed.

Metal rods 32, 33 are anchored in metal eyelets in the discs 1 and 2, the rod 32 being connected on one side of mica disc 1 by lead 34 to rod 22. The rod 33 is connected by lead 35 on the other side of this disc to the rod 22', thus providing for application of deflecting potentials to the plates 24 and 25. The lower ends of these rods 32 and 33 are connected in the usual way to outside deflection potentials.

The metal rods 36 and 37 are similarly connected by leads 38 and 39, respectively, to the metal rods 15 and 15', thus providing for application of deflecting potentials to the plates 18 and 19 with the mica disc 1 between the leads 34 and 35.

The middle rod 40 is connected by lead 41 to one of the metal strips 30. This rod 40 is also connected by lead 42 (Fig. 1) to the pre-accelerating electrode 9. The other metal strips 30 are connected by leads 41 and 42 to the second anode 11.

Connections (not shown) are made from sources of proper potentials to pairs of rods 32, 33 and 36, 37 from deflection potential sources and to the rod 40 for high potential for the second anode. Other terminals are anchored in the eyelets 45, 46 and 47, from which leads 48, 49 and 50 extend to the cathode supporting ring 7, grid 8, and first anode 10, respectively.

Leads 51 and 52 extend from other eyelets 53 and 54 in disc 2 (Figs. 3 and 4) to the terminals 55 of the heater strip for the cathode 56 which is located inside the grid 8.

What is claimed is:

1. In an electron gun, fixed spaced discs of insulating material, pairs of deflecting plates supported on one of said discs by pairs of conducting rods, and corresponding pairs of conductors having their ends anchored in said discs with the conductors for each pair adjacent each other.

2. The device of claim 1, in which electrical connections are provided between said rods and said plates and are located on opposite sides of one of said discs.

3. The device of claim 1, in which a pair of electrical connections is provided between the respective pairs of plates and rods, with one connection of each pair located on the opposite side of one of said discs from the other connection of the pair.

4. The device of claim 1, in which a metal strip

is provided for high potential and another conducting rod for high potential is located between said pairs of conductors and is connected to said strip.

5. The device of claim 1, in which a metal strip is provided for high potential and another conducting rod for high potential is located between said pairs of conductors and is connected to a source of higher potential than the other rods.

6. The device of claim 1, in which the farthest distance between any two of said rods is less than half the circumference of said disc.

7. The device of claim 1, in which conductors are provided for applying low potentials to electrodes of said gun are all located beyond the ends of the arc occupied by said pairs of conductors.

8. The device of claim 1, in which conductors are provided for applying low potentials to electrodes of said gun are all located beyond the ends of the arc occupied by said pairs of conductors, and a conductor for the highest potential to be applied to said gun is located between said pairs.

9. An electron gun, comprising discs of insulating material, diametrically opposite metal rods having their ends anchored in said discs, insulating material around said rods, electrodes supported on said insulating material, a pair of conductors with their ends connected to said discs, a pair of deflection plates supported on conductors attached to the upper one of said discs, and leads on opposite sides of said upper disc extending from the respective conductors of said pair of conductors to two of said attached conductors, respectively.

10. The device of claim 9, in which a second pair of deflection plates, a second pair of conductors, and a second pair of leads on opposite sides of said upper disc are provided.

11. The device of claim 9, in which a second pair of deflection plates, a second pair of conductors, and a second pair of leads on opposite sides of said upper disc are provided with a conductor attached to said discs and located between said pairs of conductors.

12. The device of claim 9, in which a second pair of deflection plates, a second pair of conductors, and a second pair of leads on opposite sides of said upper disc are provided with a conductor attached to said discs and located between said pairs of conductors, all of said conductors occupying an arc less than a semicircle.

13. The device of claim 9, in which a second pair of deflection plates, a second pair of conductors, and a second pair of leads on opposite sides of said upper disc are provided with a conductor attached to said disc and located between said pairs of conductors, an anode in said gun to which the highest potential is to be applied, said last named conductor being connected to said anode.

14. The device of claim 9, in which a second pair of deflection plates, a second pair of conductors, and a second pair of leads on opposite sides of said upper disc are provided with a conductor attached to said discs and located between said pairs of conductors, an anode in said gun to which the highest potential is to be applied and also to a pre-accelerating electrode, said last named conductor being connected to said anode.

15. An electron gun, having all of its conductors to which high potential is to be applied located on one side of a longitudinal plane passing through the center of said gun.

16. An electron gun, having all of its conductors and the leads thereto to which high potential is to be applied located on one side of a longitudinal plane passing through the center of said gun.

17. An electron gun, having all of its conductors and the leads thereto and therefrom to which high potential is to be applied located on one side of a longitudinal plane passing through the center of said gun.

18. An electron gun, having all of its conductors to which high potential is to be applied located on one side of a longitudinal plane passing through the center of said gun and all of its conductors to which low potential is to be applied located on the other side of said plane.

19. An electron gun, having all of its conductors to which high potential is to be applied located on one side of a longitudinal plane passing through the center of said gun, leads connected to said conductors and mica between said conductors wherever they cross each other.

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