

Feb. 17, 1948.

R. O'LARTE ET AL

2,436,264

ELECTRON GUN FOR CATHODE RAY TUBES

Filed June 14, 1945

2 Sheets-Sheet 1

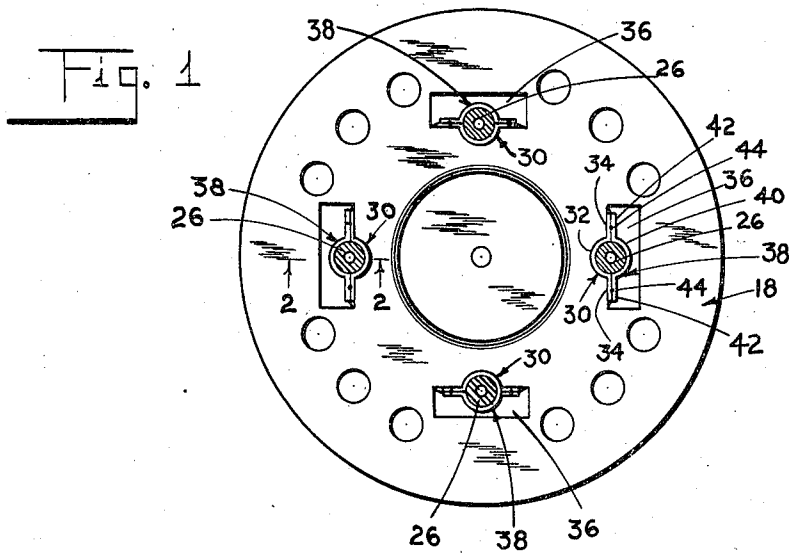
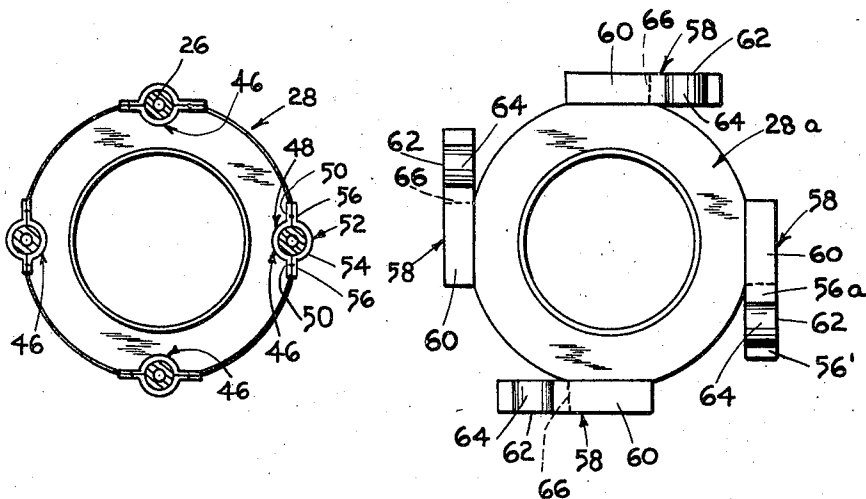


Fig. 4

Fig. 7



INVENTORS  
RUDOLPH O'LARTE AND  
GEORGE VOLLET  
BY *Edwin Leisner*

ATTORNEY

Feb. 17, 1948.

R. O'LARTE ET AL

2,436,264

ELECTRON GUN FOR CATHODE RAY TUBES

Filed June 14, 1945

2 Sheets-Sheet 2

Fig. 5

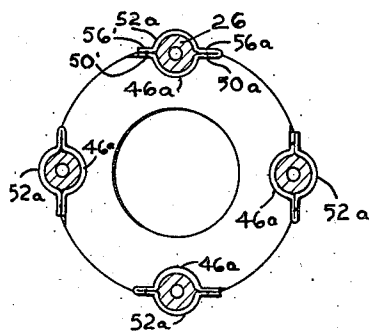
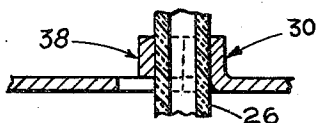


Fig. 2

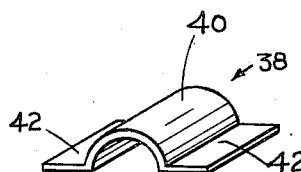
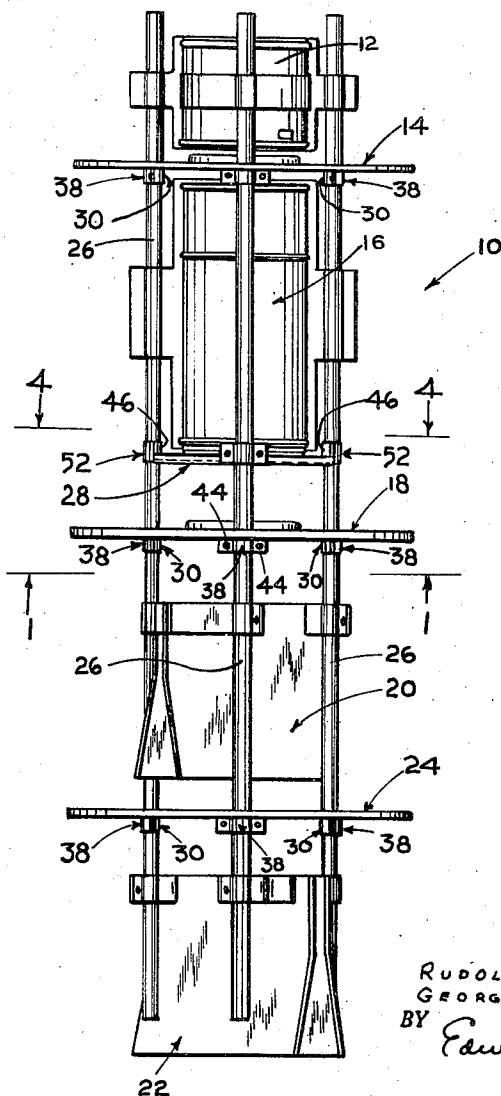


Fig. 3

Fig. 6



INVENTORS  
RUDOLPH O'LARTE AND  
GEORGE VOLLET  
BY *Erwin Leisohn*

ATTORNEY

## UNITED STATES PATENT OFFICE

2,436,264

## ELECTRON GUN FOR CATHODE-RAY TUBES

Rudolph O'Larte, Rego Park, and George Vellot,  
Freeport, N. Y., assignors to Jacques Kreisler  
Manufacturing Corporation, North Bergen,  
N. J., a corporation of New Jersey

Application June 14, 1945, Serial No. 599,330

15 Claims. (Cl. 250-162)

1

This invention relates to electronic devices and more particularly to electron guns for cathode ray tubes.

The primary object of the present invention is to provide an improved method of and means for securing various parts of the electron gun to the insulation rods. Heretofore metal disks forming parts of the electron gun were provided with eyelets through which the insulation rods extended, and the securement of the disks to the rods was effected either by compressing the eyelets against the rods or by the use of ceramic cement. When the securement was accomplished in the first mentioned manner, namely, by compression of the eyelets, breaking of the insulation rods frequently occurred and other difficulties were encountered. On the other hand, when the disks were secured to the rods by cement the structure lacked a proper degree of sturdiness and moreover the cementing operation itself was in general undesirable and troublesome. The objections and disadvantages of the previous methods of fastening the disks to the insulation rods are eliminated by the present invention. More specifically, in accordance with the present invention it is unnecessary either to resort to the use of cement or to the operation of compressing eyelets for fastening the disks to the insulation rods.

The above and other objects, features and advantages of the present invention will be fully understood from the following description considered in connection with the accompanying illustrative drawings.

In the drawings:

Fig. 1 is a side view of part of an electron gun, with the insulation rods shown in section, said view being taken on the line 1-1 of Fig. 6;

Fig. 2 is a sectional view on the line 2-2 of Fig. 1;

Fig. 3 is a perspective view of one of the members utilized in accordance with the present invention for fastening the disks to the insulation rods;

Fig. 4 is a sectional view on the line 4-4 of Fig. 6;

Fig. 5 is a view similar to Fig. 4 showing a modification;

Fig. 6 is a view of an electron gun;

Fig. 7 is a plan view of a blank from which the disk illustrated in Fig. 5 is formed.

Referring now to the drawings in detail, the electron gun 10, illustrated in Fig. 6, comprises the grid 12, the accelerator 14, the first anode 16, the second anode 18, the usual sets 20 and 22 of deflecting plates, a disk 24, and the cylin-

2

dricul insulation rods 26, to which all of said parts are secured. Also, as here shown, the end disk 28 of the first anode 16 is secured to said insulation rods 26. The accelerator disk 14, the anode disks 18 and 28, and the disk 24 are formed of sheet metal. The present invention provides improved means for securing the aforementioned disks to said insulation rods.

It will be noted that the insulation rods 26 extend through the disks and are disposed inwardly of the peripheral edges of the companion disks 14, 18 and 24, and that in the case of disk 28, said insulation rods are fastened thereto at its peripheral edge.

Referring now to Figs. 1 to 3 of the drawings, the disk 18 comprises a plurality of collar parts 30, here shown as half-collars, disposed in circumferentially spaced relation for engagement with the companion circumferentially spaced insulation rods 26 respectively. Each collar part 30 comprises a semi-cylindrical rod engaging portion 32 and a pair of outturned flanges 34. Collar parts 30 are formed integrally with disk 18 by striking up and drawing operations, openings 36 being formed in the disk incidental to the said operations for forming said collar parts. Each of said collar parts 30 projects from and is positioned transversely to the plane of the disk. A plurality of complementary collar parts 38 (Fig. 3), here shown as half-collars, are provided for said collar parts 30. Each of said complementary collar parts includes a cylindrical rod-engaging portion 40 and outturned flanges 42. As shown, the semi-cylindrical portions 32 and 40 of the companion collar parts 30 and 38 engage the companion insulation rod 26 and the flanges 34 and 42 are secured to each other in face to face relation preferably by spot welding as indicated at 44. It will be understood that the complementary collar parts 38 are secured to the companion collar parts 30 after the disk is mounted on the rods 26 with the latter engaged by the rod engaging semi-cylindrical portions 32 of collar parts 30, respectively. In order to provide a tight grip of the companion collar parts 30 and 38 on the companion rods 26, respectively, the rod engaging portion 40 of each complementary collar part 38 is preferably slightly smaller than a semi-cylinder, although it has the same radius of curvature as the companion rod engaging part 30 and of the companion insulation rod 26. Accordingly, when the complementary collar part 38 is placed in engagement with the companion rod 26 in confronting relation to the companion collar part 30 flanges 42 are spaced slightly from

3

the confronting flanges 34 of the companion collar part 30, whereby in order to weld the flanges 42 to the companion flanges 34 it is necessary to press the complementary collar part 38 tightly against the companion rod 26 with the result that at the completion of the welding operation said rod is tightly gripped between the rod engaging portions 32 and 40 of the companion collar parts 30 and 38, respectively. It will be noted that the recesses defined by the semi-cylindrical portions of the half collars 30 face toward the peripheral edge of the disk, thus facilitating the positioning of the half-collars 38 and the securement thereof to the companion half-collars 30. As illustrated in Fig. 6 the accelerator disk 14 and the disk 24, which engages the rods 26 in position between the two sets 20 and 22 of the deflector plates, are fastened to the insulator rods in the same way as disk 18, namely by the companion collar parts 30 and 38.

In the case of disks 14, 18 and 24 the rods 26 are disposed inwardly of the peripheral edges of the respective disks and the companion collar parts 30 and 38 define cylindrical openings through which said rods extend. In the case of disk 28, however, the rods 26 are disposed at the peripheral edge of the disk and accordingly the collar parts 46 are located at the peripheral edge of said disk. Said collar parts 46 are of the same construction as the collar parts 30 illustrated in Figs. 1 and 2 and like the latter are integral with the disk being formed by striking up and drawing operations to provide each of said collar parts with a semi-cylindrical rod engaging portion 48 and with a pair of outturned flanges 50. The complementary collar parts 52 are of the same construction as the complementary collar parts 38 and like the latter each half-collar 52 is provided with a semi-cylindrical rod engaging portion 54 with a pair of outturned flanges 56 which are spot welded to the companion flanges 50 so that the companion rod 26 is tightly gripped between the companion semi-cylindrical portions 48 and 54 of the companion collar parts 46 and 52. In the form of the invention illustrated in Fig. 5 the companion collar parts instead of being initially separate from each other, as illustrated in Figs. 1 and 4 are integral with each other. Thus, as here shown, the collar part 46A and the complementary collar part 52A are in integral relation, one of the flanges 50A of collar part 46A being integral with the confronting flange 56A of the companion collar part 52A. The other flanges 50' and 56' of the companion collar parts 46A and 52A are initially in nonconnected relation, and it will be understood that after the disk is placed on the insulation rods 26 flanges 50' and 56' are brought into abutting face to face relation and are spot welded to each other so that the companion collar parts 46A and 52A tightly grip the companion insulation rod. As indicated, the integral flanges 56A and 56A are also preferably spot welded to each other in face to face relation after the companion insulation rod is positioned between the rod engaging portions of said companion collar parts.

The construction illustrated in Fig. 5 is preferably formed from the blank illustrated in Fig. 7. As there shown the blank 28A for the disk is provided with a plurality of tangential extensions 58. Each extension includes a portion 60 from which the collar part 46A is formed and a portion 62 from which the collar part 52A is formed. In the initial form of the blank extensions 58A are flat and are disposed in the plane of the disk.

4

Then the portions 62 are provided with the semi-cylindrical portions 64. This operation forms the flanges 56A and 56' of the collar part 52A. Then portions 60 in the adjacent marginal edge portion of the disk are bent and drawn to provide the collar part 46A. In Fig. 7 the dotted lines 66 indicate the line of bend between the flanges 50A and 56A of the companion collar parts 46A and 52A.

It will be understood that various changes may be made in the details of construction and in the form and arrangement of the parts of the devices embodying the present invention without departing from the underlying idea or principles thereof within the scope of the appended claims.

Having thus described our invention, what we claim and desire to secure by Letters Patent is:

1. In an electron gun comprising a metal disk and a plurality of circumferentially spaced cylindrical insulation rods which extend transversely of the plane of the disk, means for fastening said disk to said rods comprising a plurality of semi-cylindrical collar parts integral with said disk and disposed transversely to the plane thereof, said collar parts being in circumferentially spaced relation on said disk and engaging peripheral surface portions of said rods, respectively, and a plurality of complementary collar parts confronting said first mentioned collar parts, respectively, and engaging peripheral surface portions, respectively, of said rods, said complementary collar parts having portions welded to portions of the companion collar parts, respectively.

2. In an electron gun comprising a metal disk and a plurality of circumferentially spaced cylindrical insulation rods which extend transversely of the plane of the disk, means for fastening said disk to said rods comprising a plurality of semi-cylindrical collar parts integral with said disk and disposed transversely to the plane thereof, said collar parts being in circumferentially spaced relation on said disk and engaging peripheral surface portions of said rods, respectively, each of said semi-cylindrical collar parts having a pair of integral outwardly extending flanges, and a plurality of complementary collar parts confronting said first mentioned collar parts, respectively, and engaging peripheral surface portions, respectively, of said rods, said complementary collar parts having a pair of outwardly extending flanges welded to the flanges of the companion collar parts, respectively.

3. In an electron gun comprising a metal disk and a plurality of circumferentially spaced cylindrical insulation rods which extend transversely of the plane of the disk, means for fastening said disk to said rods comprising a plurality of semi-cylindrical collar parts integral with said disk and disposed transversely to the plane, thereof, said collar parts being in circumferentially spaced relation on said disk and engaging peripheral surface portions of said rods, respectively, and a plurality of complementary collar parts confronting said first mentioned collar parts, respectively, and engaging peripheral surface portions, respectively, of said rods, said complementary collar parts having portions welded to portions of the companion collar parts, respectively, said companion collar parts being disposed inwardly of the outer peripheral edge of the disk and defining a cylindrical opening through which a companion insulation rod extends.

4. In an electron gun comprising a metal disk and a plurality of circumferentially spaced cylindrical insulation rods which extend transversely

5

of the plane of the disk, means for fastening said disk to said rods comprising a plurality of semi-cylindrical collar parts integral with and projecting from the plane of said disk transversely thereof, said collar parts being in circumferentially spaced relation on said disk and engaging peripheral surface portions of said rods, respectively, and a plurality of complementary collar parts confronting said first mentioned collar parts, respectively, and engaging peripheral surface portions, respectively, of said rods, said complementary collar parts having portions welded to portions of the companion collar parts, respectively, said companion collar parts being disposed at the peripheral edge of the disk and defining a cylindrical opening through which a companion insulation rod extends.

5. Means for fastening a metal disk to a cylindrical insulation rod, comprising a collar part integral with said disk and struck up therefrom, said collar part being positioned transversely of the plane of said disk and having a semi-cylindrical rod-engaging portion and a pair of flanges extending outwardly from the opposite sides, respectively, of said semi-cylindrical portion, and a complementary collar part having a semi-cylindrical rod-engaging portion and a pair of flanges extending outwardly therefrom for securement in face to face relation to said first mentioned flanges, respectively.

6. Means for fastening a metal disk to a plurality of circumferentially spaced cylindrical insulation rods, comprising a plurality of collar parts carried by said disk in circumferentially spaced relation, each of said collar parts being integral with said disk and struck up therefrom, said collar part being positioned transversely of the plane of said disk and having a semi-cylindrical rod-engaging portion and a pair of flanges extending outwardly from the opposite sides, respectively, of said semi-cylindrical portion, and a plurality of collar parts complementary to said first mentioned collar parts, each of said complementary collar parts having a semi-cylindrical rod-engaging portion and a pair of flanges extending outwardly therefrom for securement in face to face relation to said first mentioned flanges, respectively, of the companion collar parts.

7. The method of assembling a disk of an electron gun with the circumferentially spaced insulation rods thereof, which comprises providing the disk with a plurality of circumferentially spaced integral half-collars having rod-engaging semi-cylindrical portions, positioning the disk with said semi-cylindrical portions of said half-collar parts in engagement with said rods, respectively, and securing complementary half-collars to said first mentioned collars, respectively, with the rods gripped between the companion half-collars, respectively.

8. The method of assembling a disk of an electron gun with the circumferentially spaced insulation rods thereof, which comprises providing the disk with a plurality of circumferentially spaced integral half-collars having rod-engaging semi-cylindrical portions, positioning the disk with said semi-cylindrical portions of said half-collar parts in engagement with said rods, respectively, and securing initially separate complementary half-collars to said first mentioned collars, respectively, with the rods gripped between the companion half-collars, respectively.

9. The method of assembling a disk of an electron gun with the circumferentially spaced in-

6

ulation rod thereof, which comprises providing the disk with a plurality of circumferentially spaced integral half-collars having rod-engaging semi-cylindrical portions, and with complementary half-collars integral with the companion half-collars and in movable relation thereto, respectively, positioning the disk with said semi-cylindrical portions of said half-collar parts in engagement with said rods, respectively, and securing said complementary half-collars to said first mentioned collars, respectively, with the rods gripped between the companion half-collars, respectively.

10. A disk for an electron gun, said disk comprising a plurality of circumferentially spaced half-collars disposed transversely to the plane of said disk and having semi-cylindrical rod-engaging portions, respectively, each of said half-collars having a pair of out-turned flanges.

11. A disk for an electron gun, said disk comprising a plurality of circumferentially spaced half-collars disposed transversely to the plane of said disk and having semi-cylindrical rod-engaging portions, respectively, each of said half-collars having a pair of out-turned flanges, and a plurality of complementary half-collars having rod-engaging portions and pairs of out-turned flanges, respectively, one of the flanges of each of said complementary half-collars being integral with one of the flanges of the companion half-collars.

12. A disk for an electron gun, said disk comprising a plurality of circumferentially spaced half-collars disposed transversely to the plane of said disk and having semi-cylindrical rod-engaging portions, respectively, each of said half-collars having a pair of out-turned flanges, said rod-engaging portions of the half-collars defining recesses which face toward the peripheral edge of the disk.

13. In an electron gun comprising a metal disk and a plurality of circumferentially spaced cylindrical insulation rods which extend transversely of the plane of the disk, means for fastening said disk to said rods comprising a plurality of semi-cylindrical collar parts integral with said disk and disposed transversely to the plane thereof, said collar parts being in circumferentially spaced relation on said disk and engaging peripheral surface portions of said rods, respectively, each of said semi-cylindrical collar parts having a pair of integral outwardly extending flanges, and a plurality of complementary collar parts confronting said first mentioned collar parts, respectively, and engaging peripheral surface portions, respectively, of said rods, said complementary collar parts having a pair of outwardly extending flanges welded to the flanges of the companion collar parts, respectively, said first mentioned semi-cylindrical parts defining recesses which face toward the peripheral edge of the disk and said complementary collar parts having recesses which face toward the center of the disk.

14. In an electron gun comprising a metal disk and a plurality of circumferentially spaced cylindrical insulation rods which extend transversely of the plane of the disk, means for fastening said disk to said rods comprising a plurality of semi-cylindrical collar parts integral with said disk and disposed transversely to the plane thereof, said collar parts being in circumferentially spaced relation on said disk and engaging peripheral surface portions of said rods, respectively, each of said semi-cylindrical collar parts having a pair of integral outwardly extending flanges, and a

7

plurality of complementary collar parts confronting said first mentioned collar parts, respectively, and engaging peripheral surface portions, respectively, of said rods, said complementary collar parts having a pair of outwardly extending flanges welded to the flanges of the companion collar parts, respectively, said first mentioned semi-cylindrical parts defining recesses which face toward the peripheral edge of the disk and said complementary collar parts having recesses which face toward the center of the disk, said companion collar parts being disposed inwardly of the peripheral edge of the disk and defining a cylindrical opening through which a companion insulation rod extends.

15. In an electron gun comprising a metal disk and a plurality of circumferentially spaced cylindrical insulation rods which extend transversely of the plane of the disk, means for fastening said disk to said rods comprising a plurality of semi-cylindrical collar parts integral with said disk and disposed transversely to the plane thereof, said collar parts being in circumferentially spaced relation on said disk and engaging peripheral surface portions of said rods, respectively, each of said semi-cylindrical collar parts having a pair of integral outwardly extending flanges, and a plurality of complementary collar parts confronting said first mentioned collar parts, respectively,

8

ly, and engaging peripheral surface portions, respectively, of said rods, said complementary collar parts having a pair of outwardly extending flanges welded to the flanges of the companion collar parts, respectively, said first mentioned semi-cylindrical parts defining recesses which face toward the peripheral edge of the disk and said complementary collar parts having recesses which face toward the center of the disk, said companion collar parts being disposed at the peripheral edge of the disk and defining a cylindrical opening through which a companion insulation rod extends.

RUDOLPH O'LARTE  
GEORGE VOLLET.

#### REFERENCES CITED

The following references are of record in the file of this patent:

#### UNITED STATES PATENTS

| Number    | Name                | Date          |
|-----------|---------------------|---------------|
| 2,060,825 | Ressler et al. .... | Nov. 17, 1936 |
| 2,383,751 | Spangenberg .....   | Aug. 28, 1945 |

#### FOREIGN PATENTS

| Number  | Country             | Date          |
|---------|---------------------|---------------|
| 513,640 | Great Britain ..... | Oct. 13, 1939 |