May 7, 1935. A. A. NINA 2,000,570

SEPARABLE TUBE CONNECTER

Filed April 26, 1933

Fig. 1.

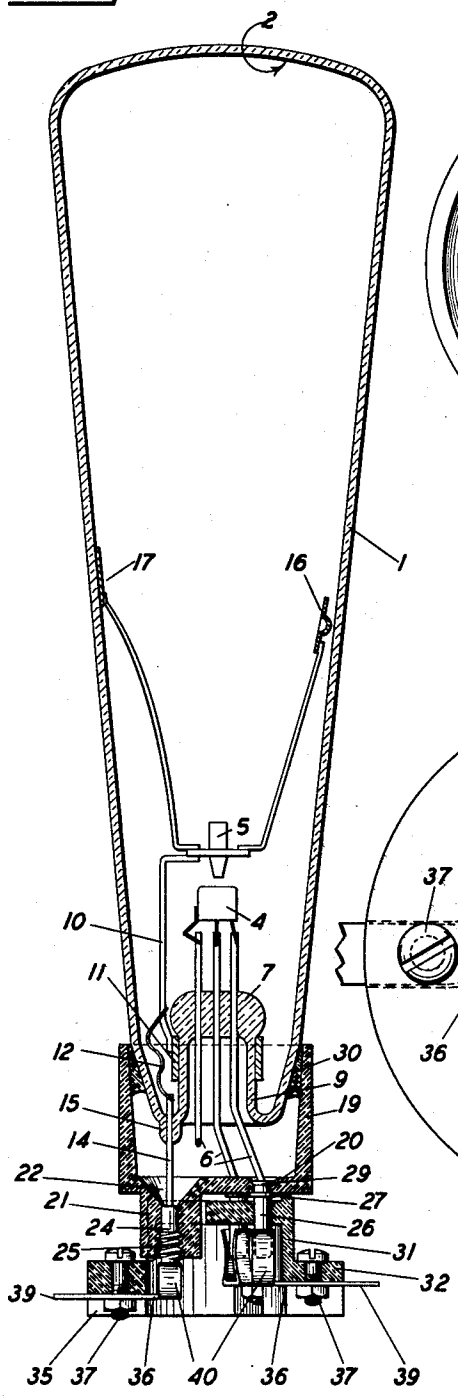


Fig. 2.

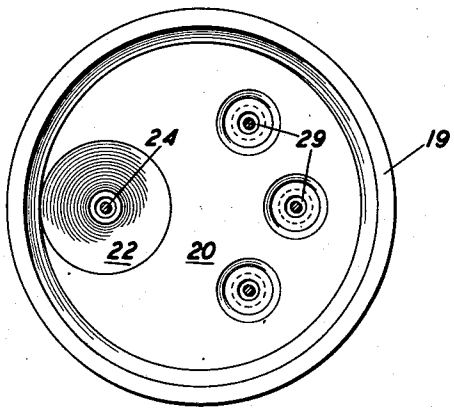
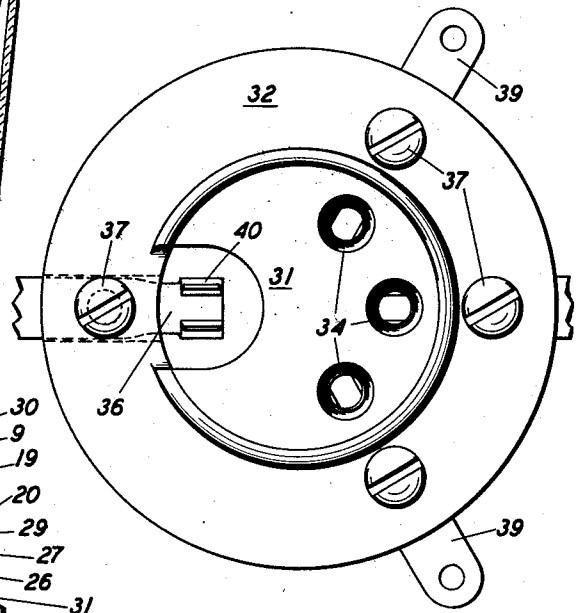


Fig. 3.



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Patented May 7, 1935 2,000,570

UNITED STATES PATENT OFFICE

2,000,570

SEPARABLE TUBE CONNECTER

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Application April 26, 1933, Serial No. 668,064

2 Claims. (Cl. 250—27.5)

My invention relates to a separable connecter for a vacuum tube and more particularly to a separable connecter for a cathode ray tube to which a high voltage anode supply is conducted.

Among the objects of my invention are: To provide a separable connecter for a cathode ray tube; to provide a base and socket to be used with a vacuum tube having a high voltage anode supply; to provide a base for a high voltage cathode ray tube in which surface leakage of the high voltage is minimized; to provide a separable connecter for a high voltage cathode ray tube in which the surface leakage of the high voltage is minimized; and to provide a simple and efficient base and socket for a cathode ray device, which will have a minimum of surface leakage between electrode conductors.

Other objects of my invention will be apparent or will be specifically pointed out in the description forming a part of this specification, but I do not limit myself to the embodiment of my invention herein described, as various forms may be adopted within the scope of the claims.

The advantages of my invention may be best disclosed by a description of the accompanying drawing, which shows a preferred embodiment of my device as applied to a high voltage cathode ray tube.

Figure 1 is a longitudinal sectional view through a cathode ray tube and the separable connecter of my invention.

Figure 2 is a view in elevation looking into the interior of the base.

Figure 3 is a view in elevation looking down upon the socket.

A cathode ray tube having an envelope 1, having a fluorescent screen 2 at one end and an electron gun comprising a grid and cathode assembly 4 and an anode 5, at the other. The grid and cathode assembly 4 is supported by electrode leads 6 sealed through a pinch 7 of a reentrant stem 9. The anode 5 is supported by an anode strut 10 connected to a stem clamp 11. A flexible lead 12 connects the anode strut with an anode lead 14 passing through an anode seal 15, at the junction of the reentrant stem 9 and the envelope 1. The anode lead is thereby spaced apart from the remaining leads and a long surface path is provided over the interior of the stem between the anode lead and the electrode leads. This spacing is not only desirable, but in many instances necessary, particularly when anode voltages of from 10,000 to 25,000 volts are to be supplied to the anode through the anode lead 14. This extended path prevents any substantial surface leakage over the stem surface, and is particularly valuable when high atmospheric humidities prevail.

Attached to the anode also is a getter cup 16 and a getter film contact 17, which however, are no part of the instant invention, having to do only with the operation of the particular cathode ray tube illustrated.

A base is provided, having a cylindrical body portion 19, provided with an integral planar bottom 20. I prefer to mold or otherwise fashion the base from an insulating material having good high frequency characteristics, such as lava, boro-silicate glass, or porcelain, plain or glazed. The size of the body portion 19 is such as to readily fit over the lead end of the cathode ray tube.

An outwardly projecting boss 21 is provided on the planar bottom, and the internal cavity of the base is extended into this boss to form a recess 22, here shown as conical in shape. A hollow anode pin 24 is centrally inserted in this boss and preferably held in place by threads 25. If desired, however, the pin may be supplied with an outer lip, and the inner end spun over, or riveted in the bottom of the recess 22. In any event the inner end of the anode pin terminates close to the bottom of the recess 22.

Hollow electrode pins 26 are inserted in holes piercing the planar portion of the bottom, the inner portion of the holes being counter sunk. The electrode pins 26 are provided with a lip 27, and the pins are held in place by a burr 29.

It is desirable that these pins do not project greatly beyond the outer end of the boss 21.

The base is placed on the end of the tube, the anode lead passing directly into the anode pin, as it is desirable that the anode pin be spaced to coincide with the spacing of the anode lead.

The other remaining leads are passed into the hollow electrode pins in the desired order. The base is then fastened to the tube by means of cement 30, and all leads are fastened to the contact pins by soldering, crimping or other convenient means.

It is desirable that the length of the boss 21 and the depth of the recess 22 therein, be such that the minimum surface distance between any point on the anode pin, and the remaining pins be not less than the surface distance between the anode lead and the remaining leads on the cathode ray tube.

I prefer to complete the separable connecter by providing a special socket adapted to receive the above described base. This socket is formed with an inverted cup-shaped portion 31 and a rim 32.

The upper surface is pierced with holes 34 to allow the electrode pins 26 to pass through, and cut away both on top and along one side to allow the boss 21 to pass through preferably without touching the base material, as shown in Figure 1.

Slots 35 are provided on the bottom of the rim to receive contact springs 36 held to the rim by bolts 37. It is desirable to allow the ends of these springs to project beyond the rim to form connection lugs 39.

The inner end of each spring is positioned beneath each of the holes and beneath the boss aperture, as shown in Figure 3. The end of the spring is formed with two opposed spring lugs 40 which spread apart to allow entrance of the pin, and grip the pins after engagement, thus making electrical contact. As the anode pin and the remaining electrode pins emerge from the base at different levels, I have shown the springs 36 at corresponding levels, the slots 35 being cut deeper for the springs making contact to the electrode pins.

In this socket, as the boss does not normally touch the base material, the surface distance between the anode pin and the others has not been shortened. If by accident it should touch, the distance is still great enough to prevent an arc starting except under the most favorable conditions for such an accident, such as the presence of actual moisture, salt spray, etc.

I have therefore maintained a sufficiently long surface path on the outside of the cathode ray tube, on the base, and on the socket, so that extreme high voltages may be used in the engaged connecter, without danger of surface leakage.

I claim:

1. A connecter comprising a male member having a substantially flat insulating surface, a contact pin projecting from said surface, a boss projecting from said surface, a contact pin projecting from the end of said boss, a female member comprising a cup-shaped insulating body having a side wall and a surface adapted to contact and support said male member and apertured to receive said first mentioned contact pin, a portion of said surface and said side wall being cut away to receive said boss, and contacts mounted beneath said apertured surface to receive said contacts pins, the portion cut away for said boss being of sufficient size so as to prevent contact between said boss and said body to prevent surface leakage between said contact pins.

2. A connecter comprising a cup-shaped male member provided with a wall of insulating material having exterior and interior surfaces, a contact pin projecting from said exterior surface, a solid boss of insulating material formed integrally with said wall and projecting from the exterior surface thereof, a contact pin projecting from said boss and passing therethrough to the interior surface of said wall, said interior surface of the wall being provided with a conical depression surrounding said contact pin, a female member comprising an inverted cup-shaped insulating body having a side wall and a surface adapted to contact and support said male member and apertured to receive said first-mentioned contact pin, a portion of said surface and of said side wall being cut away to receive said boss, and contacts mounted beneath said apertured surface to receive said contact pins, the portions cut away for said boss being of sufficient size so as to prevent contact between said boss and said body to prevent shortening of the current leakage distance between the contact pins over surfaces of the male and female members.

ANTHONY A. NINA.