Nov. 23, 1965 J. B. D'ADAMO 3,219,965

STIFF LEAD BASE

Filed Nov. 19, 1962

FIG. 1.

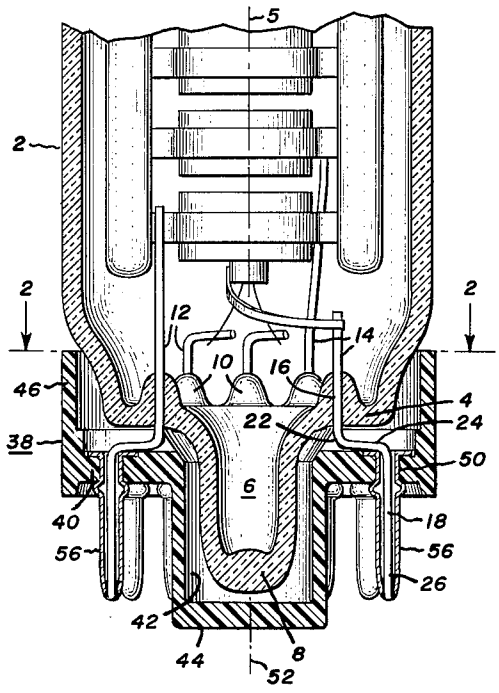


FIG. 3.

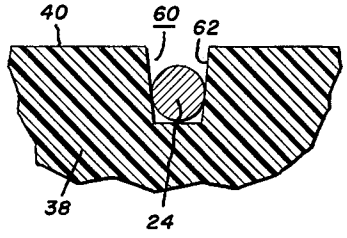


FIG. 4.

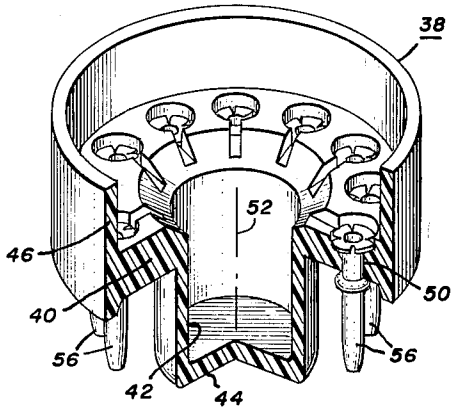
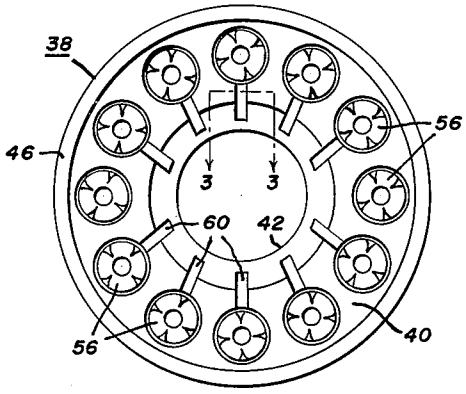


FIG. 2.



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STIFF LEAD BASE

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The present invention relates to improvements in cathode ray tubes and more particularly to an improved stem lead and base construction for electron tubes of the type having hollow pin bases.

In the manufacture of cathode ray tubes having bases of the type including hollow pins into which the stem outer leads are inserted and soldered, it has long been the practice to adhesively secure the base to the terminal portion of the tube neck and stem so as to provide adequate mechanical support for the base, insure proper base alignment relative to the remainder of the tube, and prevent relative rotation of the base and tube such as would break or short circuit the outer leads or otherwise damage or render inoperative the tube. The use of an adhesive cement to secure such a base to its tube involves dispensing the cement, and use of either expensive room-temperature curing ingredients or a time-consuming bake cycle for properly curing the cement prior to completion of the manufacturing operation. Moreover such cements sometimes prematurely lose their adhesiveness, thereby permitting the base to become loose and placing an undue mechanical stress on the stem outer leads.

One object of the present invention is to provide an improved electron tube base of the hollow pin type which does not require an adhesive connection to the tube neck and stem.

Another object is to provide an improved stem outer lead and cooperative base of the hollow pin type which particularly facilitates application of bases to tubes in a simple, rapid and fool-proof manner by relatively unskilled operators or relatively simple machinery, and with reduced chance of damage to the tube or other parts thereof.

Another object is to provide an improved stem outer lead and base construction of the foregoing character which is self-securing against relative rotation of the base and tube.

Another object is to provide an improved stem outer lead and base construction of the foregoing character which minimizes the projection of the base beyond the stem of the tube, and hence provides a reduction in overall tube length.

These and other objects are achieved in one embodiment of the invention by the provision of relatively stiff axially extending leads, each lead having an intermediate transverse portion. The leads are received by axially extending pins connected to a base member, the base member including a transverse passage associated with each pin for receiving the intermediate transverse portion of the associated lead. In this manner, the base member is secured to the tube merely by soldering or crimping the leads within the associated pin to thereby eliminate the necessity for connecting the base to the tube through the use of an adhesive material. Further, through the provision of leads having intermediate transverse portions cooperating with transverse passages in the base, relative rotation between the base and the tube is prevented.

The novel features of the invention are set forth in the appended claims. The invention itself together with further objects and advantages thereof may be best understood by reference to the following description and drawings in which:

FIGURE 1 is a fragmentary sectional view of an improved stem outer lead and base construction according to the present invention; and

FIGURE 2 is a sectional view of the structure of FIGURE 1 taken on the line 2—2 thereof; and

FIGURE 3 is an enlarged fragmentary sectional view of a portion of the structure of FIGURE 2, taken on line 3—3 thereof; and

FIGURE 4 is a sectioned and perspective view of the base of FIGURE 1.

Referring to the drawing FIGURE 1 shows a portion of the glass neck 2 of a tube, which may be a television picture tube, the neck being closed at its end by an integrally sealed glass disc or stem 4 disposed generally transverse to the neck axis 5 and provided with a central axially extending tubulation through which the tube is exhausted and which is sealed closed as at 8 at the termination of exhaust. Arranged in a circle on the interior surface of the stem is a plurality of upstanding integral fillets 10 through each of which passes a lead 12 for providing an electrical connection from the exterior of the tube to its interior. Each lead includes an inner lead portion 14 of a material such as nickel, a glass-enclosed portion 16 which may be dumet metal, and an outer lead portion 18 of a material such as nickel or nickel-iron. Each inner lead may have a diameter of, for example, .030", and the outer leads 18 may have a diameter of, for example approximately .040", so as to be relatively stiff and inflexible.

The root portion 22 of outer lead 18 emerges from the outer surface of the stem 4 in a direction generally parallel to the neck axis 5. Integrally extending transversely from the root portion 22 is an intermediate portion 24 disposed generally parallel to the plane of the stem and integrally connected at its outer end to a depending terminal portion 26 disposed generally parallel to the neck axis 5.

The base 38 includes an annular plate 40 adapted to be disposed generally parallel to the plane of the stem 4 and having a central opening 42 through which the glass tubulation 6 may extend. Depending from the periphery of the central opening is a tubular locating lug 44 of sufficient length to protectively enclose the tubulation 6 and which may be provided on its exterior surface with an outstanding key or rib (not shown) which may be received in a complementary slot in a tube socket to rotatively orient the tube in the socket. At the outer edge of the plate 40 is an integral upstanding flange 46 which protectively encloses the stem outer leads 18 and peripheral portion of the stem and adjacent portion of the tube neck 2 so as to prevent damage thereto and minimize the possibility of short circuiting of the stem outer leads. The plate 40 is provided with a plurality of axially extending openings 50 arranged in a circle concentric with the axis 52 of lug 44, and in each of these openings 50 is secured, as by staking of its upper portion, a hollow metal pin 56 arranged generally parallel to the lug axis 52.

The terminal portion 26 of each outer lead is received in a respective hollow pin 56 and electrically connected thereto as for example by a solder joint between the end of the lead terminal portion 26 and the adjacent end of the hollow pin. When the base is applied to the tube both the terminal portion 26 of each outer lead and the corresponding hollow pin 56 extend in a direction parallel to the neck axis 5, and since each outer lead 18 is of substantial stiffness and rigidity, it will be appreciated that the base may be applied to the tube by a simple thrust in the direction of axis 5, which plunges the terminal portions of the leads directly into the hollow pins.

For the purpose of locking the base against rotation relative to the stem, the inner surface of the plate 40 is provided with a plurality of transverse passages 60, such as grooves or slots or spaces between upstanding ridges, each of which is so dimensioned and arranged as to receive the transversely extending intermediate portion 24

of a corresponding outer lead **18** when the outer leads are fully inserted in the pins. Each passage **60** is preferably dimensioned, and its side walls **62** may be slightly tapered as shown in FIGURE 3, so as to relatively tightly engage the received portion of its outer lead, thereby frictionally clamping the base to the leads and providing a firm frictional connection holding the base onto the tube and eliminating any need for an adhesive cement between base and tube. To further enhance the frictional clamping engagement of base and leads, preferably the circle diameter of the lead terminal portions **26** may be slightly less, e.g., .050", than the circle diameter of pins **56**, so that the lead terminal portions **26** are slightly cammed into the pins **56** during application of the base to the tube.

Thus there has been shown and described an improved stem lead and base construction which completely eliminates the need for adhesive cement previously required to secure hollow pin bases to tubes, and securely locks the base against relative rotation on the tube. Moreover the base and lead construction of the present invention particularly facilitates application of bases to tubes in a simple and fool-proof manner by unskilled operators or relatively simple machinery. Additionally the frictional clamping fit of the outer leads in the transverse passages of the base holds the base firmly in place as applied to the tube, while minimizing the projection of the base beyond the stem of the tube and thereby reducing overall tube length. Finally the outer lead and base construction of the present invention completely eliminates the need for painstaking manual threading of the leads into the base pins, and also completely eliminates any time consuming adhesive baking operation or costly room temperature curing ingredients heretofore required with hollow pin bases of the prior art.

It will be appreciated by those skilled in the art that the invention may be carried out in various ways and may take various forms and embodiments other than the illustrative embodiments heretofore described. Accordingly it is to be understood that the scope of the invention is not limited by the details of the foregoing description, but will be defined in the following claims.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In an electronic tube having a transversely extending generally disc shaped stem provided with a central exhaust tubulation and a plurality of electrode leads extending through the stem in a circle concentric with the tubulation, each of said leads including a root portion emerging from and extending away from said stem, a terminal portion transversely outwardly offset from said root portion and extending away from said stem, and an intermediate portion transversely extending between said root and terminal portions, a base including a central lug adapted to protectively enclose the stem tubulation and

an integral outwardly extending annular plate, a plurality of hollow metal pins extending through the plate in a circle concentric with the lug and adapted to receive the terminal portions of corresponding leads, and transversely extending passages in said plate receiving with a frictional clamping fit the transversely extending intermediate portion of corresponding leads.

2. A base for application to an electronic tube of the type having a generally disc shaped stem provided with a plurality of leads extending through the stem in an annular pattern and each including a root portion and a terminal portion disposed generally normal to and extending away from the generally disc shaped stem and an intermediate portion extending generally transversely between the root and terminal portions, said base including an annular plate portion, transversely extending grooves in said plate portion arranged and dimensioned to receive with a frictional clamping fit the transversely extending intermediate portions of said leads when said base is applied to said tube, and a plurality of hollow metal pins carried by said plate portion and arranged to receive the terminal portions of corresponding leads.

3. A base for application to an electronic tube of the type having a generally disc shaped stem provided with a central exhaust tubulation extending generally normal to the stem and a plurality of circularly arranged outer leads each including a root portion and a terminal portion disposed generally normal to and extending away from the generally disc shaped stem and an intermediate portion extending generally transversely between the terminal and root portions, said base including a tubular lug adapted to protectively enclose the stem tubulation, an annular plate integrally extending outwardly from the lug and having a plurality of apertures arranged in a circle around the lug, hollow metal pins carried by the plate extending through said apertures and each adapted to receive the terminal portion of a corresponding lead, and transversely extending passages in said plate arranged and dimensioned to receive with a frictional clamping fit the transversely extending intermediate portions of said leads when said base is applied to said tube.

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