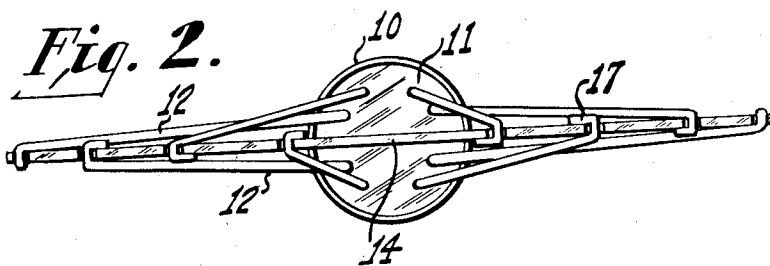
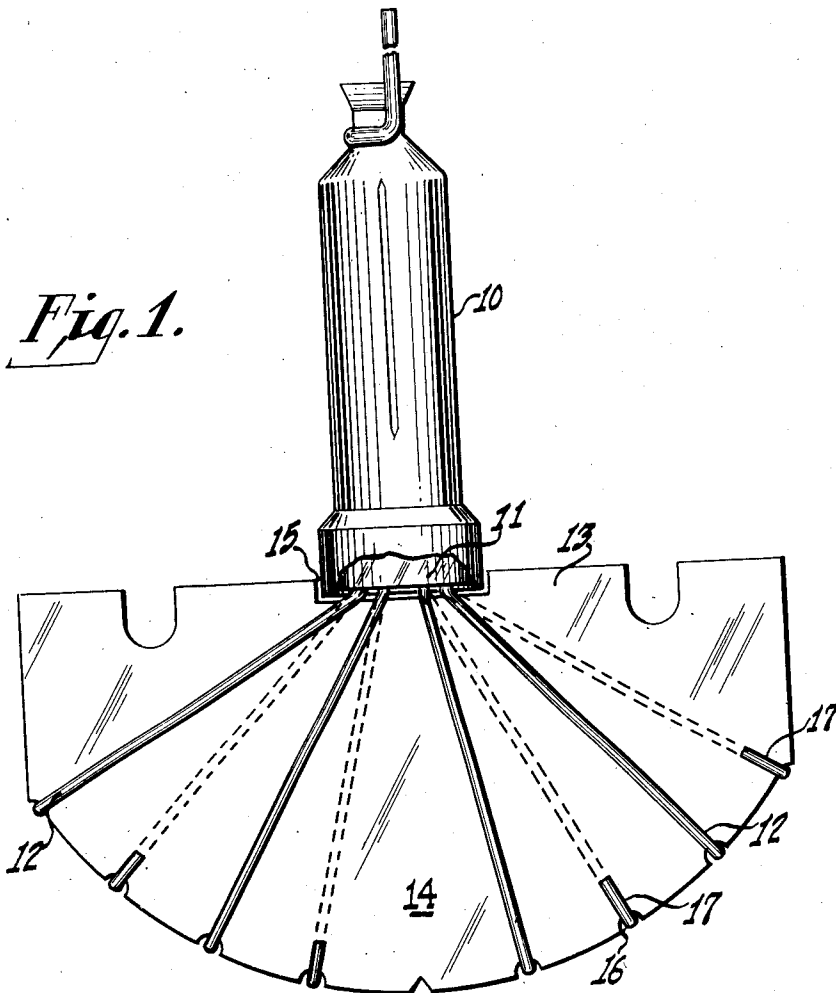


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ELECTRICAL CONNECTOR FOR TUBES  
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## ELECTRICAL CONNECTOR FOR TUBES

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6 Claims. (Cl. 250—27.5)

My invention relates to connectors for electrical devices which have a plurality of leads projecting from the outer surface of a flattened member and more particularly to an electrical connector or base for electrical discharge devices comprising a tubular envelope having a flat disc stem or closure at one end with a plurality of closely spaced leads sealed in and projecting outwardly from the stem.

Some electrical discharge devices, such as electron discharge tubes, have a tubular envelope closed at one end by an end wall or disc stem in which a number of leads are sealed to project outwardly from the stem and, in general, longitudinally of the tube. Some tubes are about an inch long and approximately three eighths of an inch in diameter with from six to eight leads sealed into the stem, the leads being arranged in a circle concentric with the center of the stem. The leads are spaced so close that it is not feasible to use a base of the conventional type nor to insert the projecting leads directly into a conventional socket because the live parts of such a base or socket would be too close for practical purposes.

The principal object of my invention is to provide for such a device or tube an electrical connector or base which is a longitudinal extension of the tube no wider than the tube and which provides between the leads and the external circuit contact points separated by distances considerably greater than the spacing of the spacing of the leads at the stem. Another object is to provide such a connector which can be inserted if desired in a socket no wider than the tube so that the tubes can be mounted side by side with minimum clearance.

Still another object of my invention is to provide a connector by means of which the leads can be separated and held with their outer ends spaced a safe distance apart to facilitate testing and other operations during the manufacture of the tube.

In accordance with my invention the connector or base comprises a sheet of insulation which is a longitudinal extension of the tube, and preferably is a sheet set on edge on the end of the tube to project vertically from the tube end, and of such size and shape that the leads may extend along the sides of the sheet base or connector with their outer ends secured to the outer edge of the sheet base at safe distances apart. The base may be permanently affixed to the tube if desired or it may be used as a convenient means for suitably spacing and holding the leads during

manufacturing operations or where the tubes are permanently placed with the leads soldered to supply conductors.

My invention will best be understood in connection with the accompanying drawing in which, merely for purposes of illustration, my invention is shown applied to a miniature type of electron discharge tube having a tubular envelope and a flat disc stem at one end, although the invention is not restricted to tubes of this type and size.

In the accompanying drawing:

Figure 1 is a side view in elevation of an electron discharge device having a base made of sheet insulation in accordance with my invention, and

Figure 2 is an end view of the tube shown in Figure 1 with the leads extending along opposite sides of the sheet base with their outer ends secured in notches in the outer edge of the base.

The particular type of tube shown comprises a tubular shell or bulb 10, preferably of metal, with a flat lower end formed by a flat disc stem 11 of glass in which there are a number of leads 12 arranged on the stem in a circle concentric with the stem. In the particular tube shown, there are eight leads uniformly spaced, and since the stem is only about three-eighths of an inch in diameter, the spacing between the leads is small. The leads extend outwardly from the stem and at the time the base is applied to the tube are preferably one or two inches long.

In accordance with my invention the connector or base 13 is made of a sheet of insulation, no greater in thickness than the spacing between two adjacent leads 12. This sheet of insulation preferably fiber, high grade cardboard, or other well-known sheet insulation, is set on the end of the tube edge-on to extend diametrically across the stem and to project vertically from the stem in substantially the plane of the longitudinal axis of the tube. The base preferably comprises a vertical semi-circular wing section 14 longer than the diameter of the base, and has in its straight upper edge a recess 15 of such a size that it fits snugly over the lower end of the bulb 10 containing the stem 11.

The leads 12 projecting outwardly from the stem lie along the sides of the base 13, as best shown in Figure 1, and extend in a generally radial direction to the outer edge of the wing 14. The leads may be drawn fairly tight and spaced evenly along the wing, with their outer ends secured to the wing, preferably by doubling or hooking them over the edge of the wing, thereby holding the base on the tube firmly enough for most purposes. If desired, the base may be per-

manently affixed to the tube by cement or adhesive that sticks to the glass stem and to the base. The outer ends of the leads are spaced along the outer edge of the wing, preferably by means of spaced notches 16 in the outer edge of the wing so that the separation of the outer ends of the leads 12 along the outer edge of the wing section is great enough to prevent short circuits and leakage. The leads may be secured to the base 13 in any convenient way, preferably by forming the outer ends of the leads into hooks 17 which fit into the notches 16. It is obvious that the outer ends of one or more of the leads may in addition be provided with some form of contact member secured to the base and joined to the end lead. Where the base is permanently secured to the tube, such contacts may facilitate the making of good connections with a suitable socket.

A base or connector constructed in accordance with my invention is useful during the manufacture of the tube in facilitating separation and holding of the leads during testing and other manufacturing operations. After testing and similar operations requiring electrical connections to the leads have been completed, the base 13 may be removed by unhooking the outer ends of the leads from the edge of the wing 14, thus leaving the leads free for whatever other operations may be required. In some cases, where eight leads are arranged in a circle and project from a stem, some of the leads may be idle and may be cut off so that in the finished tube only a part of the leads are utilized; for example, in some types of tubes eight leads are utilized during manufacture but only four leads are needed after the tube has been completed. In such case my base provides a convenient way of handling the tube with ease and safety during the manufacturing operations.

While the base is on the tube, part of the leads are distributed along one side of the base and the remainder along the other side; for example, as shown in the drawing four of the eight leads extend along one side of the sheet base and four along the other side, the outer ends of the alternate leads being hooked into successive notches so that a maximum separation of the leads during the handling and operation of the tube is obtained.

I claim:

1. An electrical connector for an electrical device having an envelope with an end wall and a plurality of leads sealed in and extending outwardly from said end wall, comprising a sheet of insulation affixed to and abutting edge-on against said end wall and projecting vertically from said end wall, said leads extending along side and secured in place on said sheet with portions remote from said end wall spaced a distance greater than the spacing between said leads at said end wall.

2. An electrical connector for an electrical device having an envelope and a plurality of leads extending outwardly from and spaced in a circle on one end of said envelope, comprising a sheet of insulation no thicker than the spacing between

adjacent leads and set on edge directly across said end and abutting edge-on against said end, said sheet fitting between the leads of two diametrically opposite pairs of leads and projecting beyond the periphery of and perpendicular to said end and having spaced notches in its free edge, said leads extending along side said sheet and hooked at their ends into said notches.

3. An electrical discharge device comprising a bulb having an end wall and a plurality of leads sealed in and projecting outwardly from said end wall, a sheet of insulation abutting edge-on against said end wall between pairs of said leads and having an integral wing projecting vertically from said end wall, and means for affixing the ends of said leads to said wing at points spaced from said end wall, said points spaced from said end wall, said points being spaced along said wing at distances greater than the spacing between said leads at said end wall, some of said leads extending along one side of said sheet and the remainder extending along the other side thereof.

4. An electrical connector for an electrical device having an envelope with a flat end and a plurality of spaced leads sealed in and extending outwardly from said end, comprising a sheet of insulation thinner than the spacing between diametrically opposite pairs of leads and longer than the diameter of said flat end, said sheet extending across and perpendicular to said end with its inner edge resting on said flat end and having in its outer edge notches spaced more widely than said leads at said end, with alternate leads extending along opposite sides of said sheet, the outer ends of said leads being secured in successive notches.

5. An electrical discharge device comprising a tubular bulb having at one end a flat stem with a plurality of leads sealed in said stem in a circle and projecting outwardly from said stem, a planar base comprising a sheet of insulation thinner than the spacing between leads in said stem, said sheet being semi-circular and affixed to said stem with the flat edge of said base abutting edge-on against said stem and positioned to extend diametrically across said stem between opposite pairs of leads, said flat edge having a notch near the middle fitted over the end of said envelope, said base having notches spaced along its curved edge at distances greater than the spacing between the leads in said stem, said leads extending radially outwardly from said stem along opposite sides of said semi-circular base with the outer ends of said leads hooked into said notches.

6. An electrical connector for an electrical device having an envelope with a flat end wall and a plurality of leads sealed in and extending outwardly from said end wall, comprising a sheet of insulation affixed to and abutting edge-on against said end wall and projecting vertically from said end wall, said leads extending along side and secured in place on said sheet with their outer ends spaced a distance greater than the spacing between said leads at said end wall.

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