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ELECTRON DISCHARGE TUBE SHIELD AND MOUNTING

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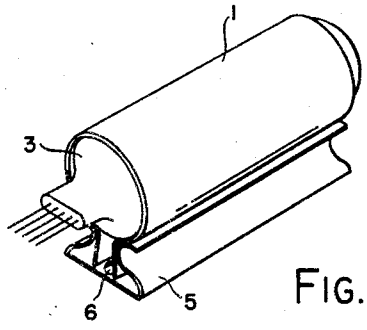


FIG. 1

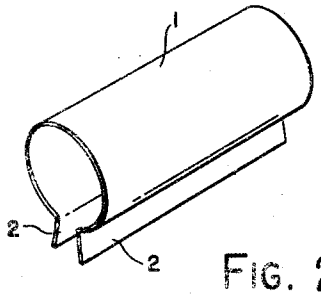


FIG. 2

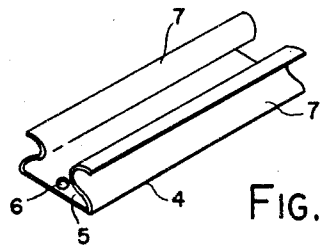


FIG. 3

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ELECTRON DISCHARGE TUBE SHIELD AND MOUNTING

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3 Claims. (Cl. 174—35)

This invention relates to a new type of tube shield and mounting for sub-miniature electron discharge tubes.

The current trend towards reduction in the size and weight of electronic apparatus has brought forth the miniature and the sub-miniature tube. The size of the latter tube is only a small fraction of that of the older standard type tubes. This reduction in size has been achieved in part by the elimination of the old Bakelite tube base with the heavy pins which were received in holes formed in a tube socket permanently wired into a circuit and affixed to a chassis.

The sub-miniature tube has no base, as such, the glass envelope now being merely pinched down around the small wire leads which have replaced the heavy pins of the older tubes.

This change in tube construction has required new means for mounting tubes and many arrangements have been developed for this purpose. These arrangements have, however, been subject to various disadvantages, among which are a tendency to scratch or stress the glass envelope, difficulty in installing or removing the tube, failure to provide an adequate heat conductive path from tube to chassis, lack of shock absorption qualities, excessive expense in manufacture and installation and waste of space.

The problem of heat removal is especially severe in miniaturized equipment due to the compactness of the assembly and the small sizes of the tubes, and the deficiency of previous mounts in this respect has been pronounced.

The objects of the present invention include the elimination of the above listed defects in a combined tube shield and mounting for a sub-miniature tube.

The objects and advantages of the invention are realized in a tube mounting which comprises a channel shaped section secured to the chassis and a longitudinally interrupted cylindrical sleeve of resilient conductive material, the edges of the interrupted portion being bent outwardly to engage flanged portions of the channel. The sleeve is dimensioned to receive the tube and to hold it snugly when the sleeve is compressed to engage its longitudinal edges in the channel section.

Other objects and advantages of the invention will become apparent from the study of the following specification in connection with the accompanying drawings, in which:

Fig. 1 is a perspective view of a tube mounting embodying the invention, the mounting being shown in assembled form enclosing a tube;

Fig. 2 is a perspective view of the sleeve portion of the mounting of Fig. 1; and

Fig. 3 is a perspective view of the channel portion of the mounting of Fig. 1.

Referring now more particularly to the drawings, there is shown an embodiment of the invention comprising a sleeve member 1 having the shape of a longitudinally interrupted cylinder. The material of the member 1 is

turned outwardly along the interruption to form a pair of flanges 2.

Coacting with the member 1 is a clip or channel member 4, shown more clearly in Fig. 3. This member comprises a rectangular flat base plate 5 which may be provided with holes 6 near its ends for attachment to a chassis. Formed integrally with the base plate 5 along the longer sides thereof are a pair of flanges 7.

Beginning at their juncture with the base plate 5 the flanges 7 rise and curve inwardly towards each other and then at about the mid-point of their shorter dimensions begin to flare outwardly. The flare continues through the remainder of the shorter dimensions.

Both the members 1 and 4 are made of springy, electrically conductive material. A satisfactory material for this purpose is hard beryllium copper. The base member 4 may be secured to the chassis by riveting, soldering or any other means which provides good conduction of heat and electricity. If the base member is to be soldered to the chassis it is preferably silver plated.

Fig. 1 shows the mounting assembled with a sub-miniature tube 3 in place within the sleeve member 1.

The cylindrical member 1 should be blackened for the most efficient absorption of heat. This member is so dimensioned with respect to the tube it is to contain that upon being laterally pinched or compressed sufficiently for the flanges 2 to be retained in the normal position of rest within the flanges 7 of the base member, the member 1 is in tight circumferential contact with the envelope of the contained tube. This makes for good heat transfer from the tube to the mount.

The flanges 2 and 6 should have enough resiliency that the member 1 may be inserted into or removed from the member 4 by either vertical or endwise relative movement. Where space is at a premium it is desirable to be able to mount or demount the tube by movement normal to the base plate 5. The resilience of the flanges 2 and 7 should be sufficient to allow such action when the mounting means is dimensioned to hold the tube firmly in place while at rest.

It can be seen that the invention obviates the difficulties referred to above as encountered with known mounting means.

It encloses the major portion of the lateral surface of the tube, providing good shielding action and conduction of heat to the chassis.

It holds the envelope firmly by uniform contact and pressure over a large area thus avoiding scratching and stressing thereof.

It permits easy installation and removal of the tube even in a crowded location.

It grips the tube firmly yet resiliently over its full length and the major portion of its circumference, thus providing an excellent shock absorbing mounting.

It is simple and inexpensive to make and install. It lends itself to high speed production and requires no heat treatment during manufacture.

It closely surrounds the tube with the very minimum of protrusion, thus economizing space to the utmost.

While the mounting and shielding means has been described for use with sub-miniature tubes, since it is particularly advantageous for such use, it also offers advantages in some situations as a mounting for other types of tubes and for mounting other cylindrical circuit components such as resistors or capacitors.

What is claimed is:

1. Means for shielding, cooling and supporting an electron discharge tube on a chassis, said means comprising a flat rectangular base member of resilient metal having an extension formed integrally with each of its longer sides and extending outwardly from the plane thereof, said extensions being shaped to form a channel having outwardly

concave sides, a member of resilient metal having the shape of a longitudinally interrupted cylinder, with the edges of said cylinder along said longitudinal interruption being turned outwardly to form a pair of flanges of substantially straight cross-sectional configuration extending radially from said cylinder, said flanges being receivable between the sides of said channel when said cylindrical member is compressed to bring the said edges of said longitudinal interruption close together, and, when so received, diverging from their juncture with said cylinder to their free longitudinal edges, said cylindrical member being so dimensioned as to completely enclose and grip said tube snugly over substantially its complete length when said tube is contained therein and said flanges are at rest within said channel, whereby said members substantially completely shield and conduct heat away from the lateral surface of said tube.

2. Means for shielding, cooling and supporting a cylindrical electrical circuit component on a chassis, said means comprising a flat rectangular base member of resilient metal having an extension formed integrally with each of its longer sides and extending outwardly from the plane thereof, said extensions being shaped to form a channel having a cross-section which is uniform along its length, said extensions converging to a minimum separation which is less than the shorter dimension of said base member, a member of resilient metal having the shape of a longitudinally interrupted cylinder, with the edges of said cylinder along said longitudinal interruption being turned outwardly to form a pair of flanges of substantially straight cross-sectional configuration extending radially from said cylinder, said flanges being receivable between the sides of said channel when said cylindrical member is compressed to bring the said edges of said longitudinal interruption close together, and, when so received, diverging from their juncture with said cylinder to their free longitudinal edges, said cylindrical member being so dimensioned as to completely enclose and grip said component snugly over substantially its complete length when said component is contained therein and said flanges are at rest within said channel, whereby said members substantially completely shield and conduct heat away from the lateral surface of said component.

3. Means for shielding, cooling and supporting an electron discharge tube on a chassis, said means comprising a flat rectangular base member of resilient metal having an extension formed integrally with each of its longer sides and extending outwardly from the plane thereof, said extension being shaped to form a channel having a cross-section which is uniform along its length, said extensions converging to a minimum separation which is less than the shorter dimension of said base member, a member of resilient metal having the shape of a longitudinally interrupted cylinder, with the edges of said cylinder along said longitudinal interruption being turned outwardly to form a pair of flanges of substantially straight cross-sectional configuration extending radially from said cylinder, said flanges being receivable between the sides of said channel when said cylindrical member is compressed to bring the said edges of said longitudinal interruption close together, and, when so received, diverging from their juncture with said cylinder to their free longitudinal edges, said cylindrical member being so dimensioned as to completely enclose and grip said tube snugly over substantially its complete length when said tube is contained therein and said flanges are at rest within said channel, whereby said members substantially completely shield and conduct heat away from the lateral surface of said tube.

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