May 18, 1937. T. M. SHRADER 2,080,837

TUBE BASE

Filed April 2, 1935

Fig. 1

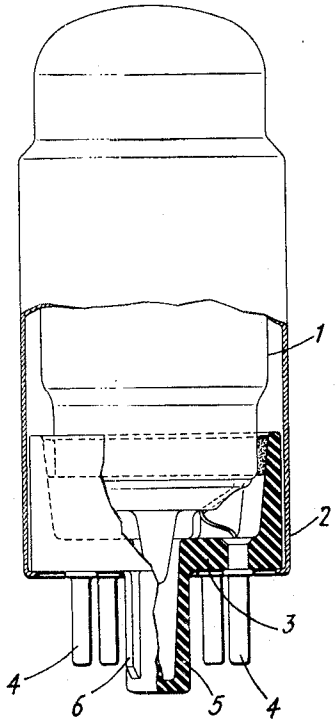


Fig. 3

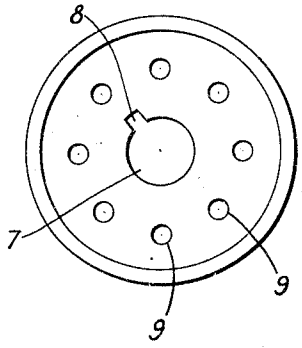
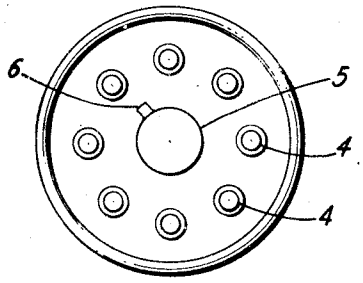


Fig. 2



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TUBE BASE

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5 Claims. (Cl. 250—27.5)

This invention relates to electrical devices having connector members with projecting contact pins, and more particularly to base and socket constructions to facilitate registering the base of an electrical discharge device with the socket and to insure the insertion of the contact pins of the base in the right contact holes of the socket.

In conventional types of radio receiving tubes the contact pins on the base are often asymmetrically arranged or unevenly spaced to insure that the base will be inserted in the socket with the contact pins in the right socket contacts. For example, the contact pins for the cathode heater have been more closely spaced than the other contact pins. The asymmetrical arrangement of contact pins on the base of electron discharge devices has the disadvantage that a change in the number of contact pins necessitates a rearrangement of the contact pins on the base and a special socket for each pin arrangement. In tubes with small envelopes and bases, and several electrodes with a corresponding number of contact pins, the spacing of the contact pins subjected to high potential and to high frequency approaches the minimum allowable spacing of the cathode heater contacts. The small diameter of the tube base and the crowding of the tubes in small radio receivers cause difficulties in properly inserting a tube in its socket.

An object of my invention is to provide a pin and socket connector in which a pin carrying member, such as a tube base, may be easily aligned with the socket and rotated on the socket without losing alignment to bring the right pins into registry with the right socket contacts and permit the pins to enter only the correct socket contacts.

Another object of my invention is to provide a pin and socket connector in which a socket having a fixed number of socket contacts may without mechanical change, and merely by changes in the wiring or electrical connections of the socket be used for bases having a lesser number of contact pins, so that a standard socket may be used for different types of tubes with different numbers of contact pins.

A further and more specific object of my invention is to increase the firmness with which the tube base is held in its socket.

A fuller understanding of my invention may be had by referring to the accompanying drawing in which Figure 1 is a sectional view of a tube embodying my invention; Figure 2 is a bottom view of the device shown in Figure 1; and Figure 3 is a plan view of a socket adapted to receive the contact pins and guide member of the tube base of Figure 1.

In the particular embodiment of my invention shown in Figure 1, a tube of conventional construction and having a glass envelope 1 of conventional contour enclosed in a metal shield or shell has at its lower end a base 2 with a flat disc portion 3. Leads to the various electrodes within the envelope are brought out thru seals in the lower end of the envelope and soldered or otherwise suitably secured to contact pins 4 mounted on and projecting downwardly and side by side from the disc 3. As distinguished from the usual construction where the contact pins are unevenly spaced the pins are preferably, in accordance with my invention and as best shown in Figure 2, are evenly spaced and arranged symmetrically in a circle concentric with and near the periphery of the disc portion 3 of the base, thus providing for uniform and substantially maximum spacing between the contact pins in the base.

In applying my invention to this form of tube, I provide on the base a guide member or centering pin 5, preferably integral with the base and extending downwardly from the center of the base a distance preferably greater than the length of the projecting portions of the contact pins, so that it is inside and concentric with the circle on which the contact pins are spaced and projects beyond the ends of the contact pins. The centering pin 5 has at the outer end a cylindrical end portion long enough to act as a journal when inserted in a central opening in the socket and thus permits free journalling of the base about the center of that opening as an axis, and also has a remaining or body portion of which the part adjoining the end portion is non-circular or eccentric to the end portion to provide a kind of shoulder or stop at the inner end of the end portion. A convenient way of making that part of the centering pin adjacent the end portion sufficiently non-circular or eccentric to the end portion is to provide on one side of the body portion a radial projection or raised portion, such as a longitudinal key 6, with its lower end projecting radially beyond the periphery of the cylindrical end portion to provide a shoulder or stop at a point on the guide member such that the pins cannot engage the socket contacts unless the base is in a definite angular position on the socket. When the base is to be used with a flat top socket having socket contacts flush with the top, the lower end of key 6 should be far enough from the disc 3 of the base to be beyond the outer or exposed ends of the contact pins.

In inserting a tube with a base constructed in accordance with my invention into the socket shown in Figure 3, which is of the flat top type having a central hole or opening 7 with a key-way 8 in the side, and contact sockets 9 arranged in a circle concentric with the opening 7 and of the same diameter as the circle in which the contact pins 4 are arranged, the cylindrical end portion of the guide member 5 may be inserted in any angular position a substantial distance with the central hole or opening 7 of the socket. The base is thus journalled in the socket concentrically with respect to the socket, but with the lower end of the key 6, which projects beyond the rim of the hole 7, holding the contact pins out of electrical contact with the socket contacts 9. Then by rotating the base the key 6 will come into registry with the key-way 8 of the socket at which time the tube and base will drop into the socket, with the contact pins 4 in substantial alignment with the right holes or contacts 9 in the socket. It will be noted, further, that centering lug 5 serves to give substantial lateral support to the tube in its socket, thus eliminating tilting and loosening of the tube in its socket.

I claim:

1. A vacuum tube base comprising a flat plate member of insulating material adapted to be secured to the envelope of a thermionic discharge device, contact pins secured to and perpendicularly extending from one side of said member, a circular centering pin integral with said member extending parallel with said pins from said member a distance greater than the end of said pins, and a raised portion on one side of said centering pin intermediate the end of said centering pin and a plane through the ends of said contact pins.

2. In a vacuum tube base an insulating base member with outwardly extending contact pins, a base centering guide member attached centrally to said insulating base member and extending beyond the ends of said contact pins, and a key secured to the outer wall of said guide member intermediate the outer end of the guide member and a plane through the outer ends of said contact pins.

3. In combination, an electron discharge device with a base having a guide member projecting from the center of said base along the longitudinal axis of said device, contact pins shorter than said guide member secured to said base in a circle concentric with said guide member to project from said base parallel to said guide member, said guide member having a key on one side beyond the ends of said contact pins and also having a cylindrical outer end beyond said key; and a socket having a central opening in which said cylindrical end of said guide member may be journalled to rotate said device about its longitudinal axis and shaped to receive the key portion of said guide member only in a predetermined angular position of said guide member, and contact members arranged around said central opening to receive the contact pins of the base.

4. In combination, a base for an electron discharge device having a guide member projecting from the center of said base normal to the plane of said base, contact pins secured to said base in a circle concentric with said guide member to project from said base parallel to said guide member; and a socket having an opening substantially of the size of said guide member in which the outer end of said guide member may be inserted and journalled to freely rotate about the center of said opening as an axis, female contact members arranged in a circle of the same size as said circle of contact pins and concentric with said opening, said opening and said guide member having a cooperating key and keyway to permit, when in registry, the further insertion of said guide member into said opening.

5. In an electrical connector a flat pin carrying member, a plurality of contact pins mounted on said member in a circle to project perpendicularly and side by side from said member, and a centering pin projecting perpendicularly from the center of said member inside and concentric with said circle of contact pins, said centering pin having a cylindrical end portion of sufficient length to constitute a journal and a shoulder of angular extent less than a half circle located on the pin inward from the end portion in position to permit said contact pins to reach operative position in only one predetermined angular relation of said member to a cooperating socket.

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