April 12, 1955 M. J. SCHNURR 2,706,281

MINIATURE VACUUM TUBE SOCKETS

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FIG. 1

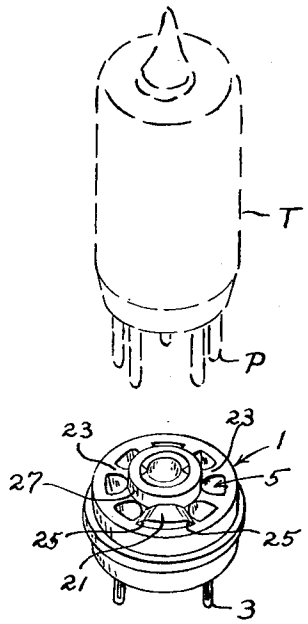


FIG. 2

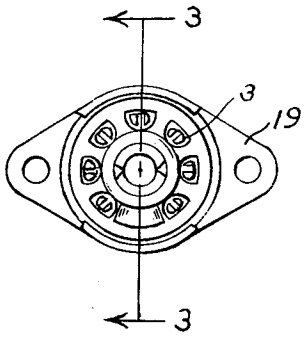


FIG. 3

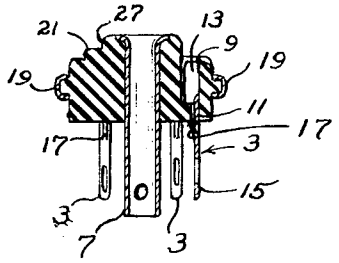


FIG. 4

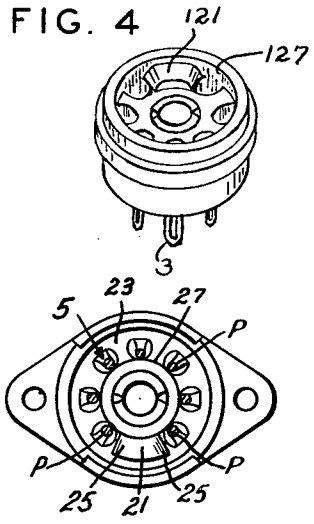


FIG. 5

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MINIATURE VACUUM TUBE SOCKETS

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1 Claim. (Cl. 339—65)

This invention relates to electronic equipment, and more particularly, to sockets for miniature vacuum tubes and the like.

The so-called miniature vacuum tube cannot be equipped with an aligning plug, as provided on the more conventional octal-base tube. It has therefore become a standard practice in the miniature tube field to use the octal pattern for the disposition of tube pins and pin receptacles, but to omit one of the pins from the tube and one of the pin receptacles from the socket. This asymmetrical arrangement insures that the tube will be properly connected in the circuit; but difficulty is encountered in fitting a tube to a socket, particularly when the socket is in a blind location. Although the tube can be fully inserted in only one predetermined position with respect to the socket, a partial insertion is possible at any one of seven other positions. In practice, the individual concerned must rotate the tube, trying out each position, until he detects through his tactile sense the position in which the tube may be fully inserted.

With present-day electronic equipment, there may be a considerable number of tube sockets in blind locations, consequently the installation of miniature tubes could readily become a time-consuming operation. If the individual hurried the task of insertion, he risked breaking off one of the thin tube pins by attempting a full insertion when the tube was not properly aligned.

It is accordingly an object of the present invention to provide a miniature tube socket, to which a tube may be more conveniently fitted.

In the attainment of this objective, briefly, the pattern of receptacles described above is preserved; that is, the pin receptacles are uniformly spaced but for one wide gap of a width twice the normal spacing. On the upper surface of the socket at this wide gap I provide an elevated step having smoothly sloping sides, and in conjunction therewith, I provide a circular guiding wall elevated above said step in tangential relationship with the pin receptacles. In use, the tube is fitted over the socket and rotated, the pins being guided about the circular wall and riding smoothly over the step until the relatively wide gap therebetween encounters the step, whereupon the tube drops inward to provide a pronounced sensory indication of alignment. The tube can then be fully inserted against the frictional resistance of the terminal clips, with assurance that proper alignment has been made.

Inasmuch as the tube pins are maintained elevated above the socket receptacles while riding over the step, the user is not required to test out various positions of partial insertion, as in the past, but instead may await the more pronounced sensory perception of alignment, thereby avoiding pin damage that has heretofore been encountered in attempting to make a full insertion under a mistaken sensory perception of alignment.

Other features of the invention will be in part apparent from and in part pointed out in the following detail description taken in connection with the accompanying drawings, in which:

Fig. 1 is an oblique view of a socket for miniature vacuum tubes illustrating one embodiment of the invention, a miniature tube being shown in dotted lines;

Fig. 2 is a plan view of the socket shown in Fig. 1;

Fig. 3 is a vertical section on the line 3—3 of Fig. 2;

Fig. 4 is a view similar to that of Fig. 1 illustrating an alternative embodiment of the invention; and

Fig. 5 is a view similar to that of Fig. 2, but showing the tube pins inserted within the socket.

With the so-called octal-base type of tube socket, there are eight pin receptacles arranged symmetrically about an aligning keyhole. The tube (which may have any number of pins up to eight extending through a plastic base) is provided with a centrally-depending plug. The plug, in turn, has an aligning key, which cooperates with the keyhole in the socket to insure that the tube pins enter the proper receptacles in the socket. In use, the tube is placed over the socket with the tip of the plug partially seated in the keyhole, the tube is rotated until the aligning key thereof drops within the key slot, and the tube is then pushed in against the frictional resistance of the terminal clips.

Referring to Fig. 1 of the drawings, there is shown a miniature type of vacuum tube T. Customarily, its base is made up of thick glass as an integral part of the envelope, and for this reason as well as size limitations, it is not possible to provide an aligning plug. In order to achieve an aligning effect, seven tube pins P are asymmetrically disposed in an octal type of pattern so that the spacing therebetween is uniform but for one wide gap, the width of which is twice the normal spacing. These tubes are then used with sockets wherein the pin receptacles are similarly disposed, thereby assuring that the pins will be properly connected in the circuit. It may be noted, however, that this arrangement does not have the convenience of insertion of the more conventional octal-base socket.

Instead of merely rotating the tube until an aligning key drops within the keyhole as in the case of an octal-base tube, a miniature tube tends to lock in any one of eight positions relative to the socket (as a result of partial entry of some of the pins within some of the socket receptacles), but only one such position permits full insertion of the tube. This partial entry of the pins makes it difficult to tell just when the tube is properly aligned with the socket, and the thin pins can be readily damaged unless a careful, time-consuming tactile testing procedure of the various positions is followed.

Such sockets comprise a cylindric body 1 of insulating material, generally molded plastic, and a series of spring clips 3 recessed therewithin for gripping the terminal pins of the tube. The clips 3 are located in receptacles 5 disposed about the center of the body 1 according to conventional practice, and a metal tubular shielding element 7 extends axially through and below the body. In the device illustrated, there are seven receptacles 5, but it will be apparent that the invention is applicable to sockets having a different number of receptacles, provided the gaps therebetween are of approximately the same size but for one gap, which is larger than the others.

Various methods of securing the clips 3 are known in the art; for example, each receptacle 5 may have a large mouth 9, which narrows at 11 in the lower portion of the body. The large bifurcated head 13 of the clip seats in the large mouth 9, while a narrow tongue 15 projects through the throat 11. Such a clip could be entered from the top and secured by a lug 17 struck from the tongue portion to engage the bottom of the socket. The plastic body 1 of the socket usually is secured within a bracket 19 for mounting the same on a chassis.

On its upper face, the socket herein differs from prior constructions in that a step 21 is formed at the wide gap in elevated relationship with respect to portions 23, which form the smaller gaps. This step should have smoothly sloping sides 25 for purposes to be described, and should extend substantially completely across the wide gap. Also, there is a circular guide 27 lying adjacent (preferably tangential) to the receptacles 5 and projecting above the step 21. In Fig. 1, this guide wall 27 is located inwardly of the receptacles, but it may be disposed outwardly thereof as shown at 127 in Fig. 4, or there may be both inner and outer walls, forming a groove. In each case, however, a guide wall should extend above the top of the step.

In making a tube insertion in this type of socket, the tube is positioned with its pins disposed about the circular wall for guided rotation. The step 21 will then

maintain the pins out of engagement with the receptacles 5 or adjacent portions 23 until the pins are properly aligned. A condition of alignment is readily detected because the tube drops inwardly when the wide gap between pins encounters the step. While being rotated to a condition of alignment, the more closely spaced pins ride smoothly over the step clear of the receptacles, the operation being similar to that of tubes having aligning plugs.

From the foregoing, it will be apparent the improved socket herein disclosed greatly simplifies the task of installing miniature tubes without requiring any change in the tubes. Moreover, tube damage heretofore rather frequent with inexperienced installers will be substantially reduced. In manufacturing such a socket, the only change required is that of the mold for the body 1, but even existing sockets can be equipped with adapters which would have step and circular guide portions, as in Fig. 1, secured by a stud fitting within the tubular shielding element.

Although several embodiments have been disclosed in detail, it is to be understood that the invention is not limited thereto, but the drawings and description thereof are to be understood as being merely illustrative. It is realized that many modifications and variations will present themselves to those skilled in the art without departing from the spirit of this invention or the scope thereof as set forth in the appended claim.

Having thus described the invention, what is claimed and desired to be secured by Letters Patent is:

The combination of a miniature electronic tube having a plurality of projecting pins spaced from one another so as to lie tangential with a circle of predetermined diameter, and a socket of insulating material formed with a plurality of pin receptacles which are disposed in a circle to receive said pins; said pins and receptacles being uniformly spaced from one another but for one gap which is substantially wider than the others, a step formed at the receptacle end of the body to project endwise beyond those portions of the body lying between and defining said other receptacles, said step having sloping shoulders adjacent the two receptacles that define the wide gap, and a circular centering guide wall formed at said end of the socket body to project endwise beyond said step, said circular guide wall being tangential with the pin receptacles and of the same diameter as said tangential circle defined by the tube pins.

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