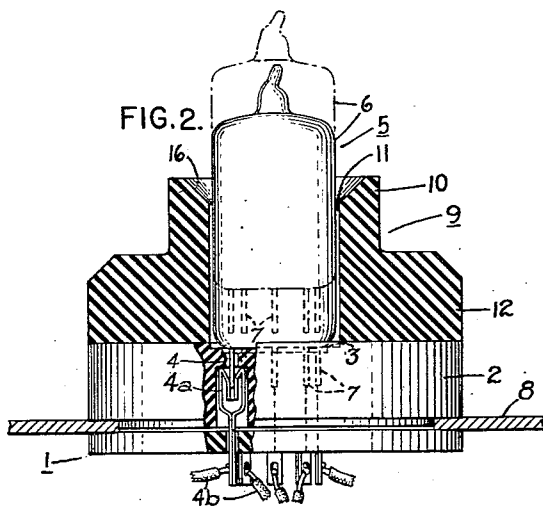


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BY:

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## TUBE SOCKET

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1 Claim. (Cl. 339—66)

My invention relates to electronic tube sockets and pertains more particularly to a new and improved tube socket adapted for facilitating the insertion and removal of tubes and to avoid bending of the leads thereof.

In the manufacture of electronic tubes and following exhaust and tip-off thereof, it is common practice to insert and withdraw each tube from a plurality of sockets in order to carry out such processes as seasoning, aging, preheating and testing. Usually a large number of sockets are arranged in racks for each operation and an operator is employed to insert and remove the tubes. Now it will be seen that the number of tubes an operator can process in a given time is largely dependent upon the ease with which the tubes can be inserted and removed from the sockets. This is especially true of small tubes such as those commonly known as miniature tubes and sometimes referred to in the industry as 7-pin and small button 9-pin tubes. Due to their sizes, such tubes are difficult to handle and generally require more time for insertion in a socket. Additionally, the pins or leads of such tubes are thinner than those of larger tubes and inasmuch as there is a somewhat natural tendency for an operator to rock or move a tube back and forth out of its vertical position in removing it from a socket, the leads of miniature tubes are often bent during removal. Thus it is desirable to provide means for facilitating the insertion and removal of tubes from tube sockets and for avoiding bending of tube leads during removal. Further, it is desirable to accomplish this either by providing sockets including the above mentioned desired means or by providing means for modifying presently employed sockets in order thereby to avoid the expense of replacing such sockets.

Accordingly the primary object of my invention is to provide a new and improved tube socket.

Another object of my invention is to provide a new and improved tube socket adapted for facilitating insertion and removal of tubes.

Another object of my invention is to provide a new and improved tube socket adapted for avoiding the bending of tube leads during removal of the tubes from the socket.

Another object of my invention is to provide means for modifying existing sockets to facilitate insertion of tubes therein and removal of tubes therefrom and to avoid bending of the tube leads.

Still another object of my invention is to provide a new and improved tube socket including means for facilitating insertion and removal of tubes and avoiding bending of the leads thereof which is simple in construction and which may be easily and inexpensively manufactured.

In carrying out the objects of my invention I provide means including a tubular portion for guiding a tube so as to effect guiding insertion and removal of the tube leads, respectively, into and out of the lead receptacles of a tube socket. The tubular portion is adapted to guide the tube and prevent substantial lateral movement thereof until the leads are completely removed from the recep-

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tacles. Additionally, the outer end of the tubular portion is flared to provide an enlarged entrance for the tube.

For a better understanding of my invention reference may be had to the accompanying drawing in which:

5 Fig. 1 is an exploded perspective viewing illustrating my invention; and

Fig. 2 is a partially sectionalized elevational view further illustrating my invention.

Referring to Fig. 1 I have shown a tube socket generally designated 1 and including a base portion 2. The base portion 2 is formed of any suitable insulating material and includes a central depression 3 in which is located a plurality of tube lead receptacles generally designated 4 and arranged in a substantially circular array. The receptacles 4 each include a spring clip 4a only one of which is shown in full in Fig. 2 for convenience of illustration. The outer ends of the spring clips 4a are adapted for having conductors 4b suitably electrically connected thereto. Thus the socket 1 is adapted for effecting electrical connections between the conductors 4b and the tube leads 7 inserted in the receptacles 4.

The socket 1 is of a type generally employed in large numbers in the electronic tube industry in the processing of tubes such as that shown in Fig. 2 and designated 5. The tube 5 comprises an evacuated cylindrical envelope or bottle 6 and a plurality of pins or leads 7 extending from the bottom of the bottle in an array corresponding to that of the receptacles 4 in the socket 1.

In the manufacture of tubes such as 5 each tube must pass through several processes such as seasoning, aging, preheating and testing. For each of these processes there is usually provided one or more racks of sockets 1. These racks comprise a plurality of sockets suitably mounted on a frame or plate 8. Generally, an operator is employed to service a plurality of racks of sockets. That is, it is the operator's job to insert tubes into the sockets for processing of the tubes and thereafter to remove the tubes. It will be seen that the number of tubes that each operator can insert for processing in a given time and the operator's efficiency are largely dependent on the ease with which the tubes can be inserted. Therefore, I have provided means for facilitating the insertion of the tubes in the sockets, thereby to increase the efficiency of the operator and the number of tubes each operator can cause to be processed.

As seen in Figs. 1 and 2 the means I provide comprises a member 9 formed preferably of any suitable insulating material. The member 9 includes a portion 10 which is substantially tubular or, more specifically, includes a longitudinally extending cylindrical bore 11 which is adapted for registering with the depression 3 in the upper surface of the socket 1. Additionally, the member 9 is formed to include a flange or base portion 12. By means of a plurality of screws 13 adapted for extending through a plurality of apertures 14 in the base portion 12 and into suitably threaded apertures 15 in the socket 1, or any suitable fastening means, the member 9 is adapted for being secured to the socket 1 in the relative position shown in Fig. 2.

The cylindrical bore 11 in the member 9 is just slightly larger in diameter than the cylindrical envelope of the tubes 5 to be inserted into the sockets. When a tube is to be inserted into the socket the operator simply places it into the bore 11 whereby it is guided downwardly toward the socket. With a substantially continuous motion the operator rotates the tube while exerting a slight downward force thereon. Thus when the leads 7 find the receptacles 4 they quickly move thereinto and the tube is satisfactorily inserted in the socket, in the manner shown in solid lines in Fig. 2.

Additionally, insertion of the tube is facilitated and insertion time is shortened by provision of a flare or

countersink 16 at the outer or upper edge of the bore 11. This provides an enlarged opening or entrance for the operator to find during the initial insertion movement or when the tube is being inserted into the bore 11 for guided movement of the leads thereof into the receptacles 4.

It will be seen that the countersink 16 facilitates finding and insertion of the tube into the bore 11 and the bore 11 itself facilitates finding of the receptacles 4 by the leads 7 and jointly and severally these provisions both increase the efficiency of an operator and increase the number of tube insertions possible in a given period. In turn, the number of tubes that may be processed in a given time is increased.

My device is further adapted to avoid bending of the tube leads 7 during removal of the tube from the socket. In removing tubes, such as 5, it is desired that they be removed substantially vertically in order not to bend the leads 7. However, there appears to be a natural tendency for one to rock a tube or to move it back and forth out of its vertical position to loosen the leads 7 from the receptacles 4. Additionally, there is sometimes a tendency just to pull a tube out of a socket to one side of its vertical position, especially when it is being done quickly as when one is hurriedly removing a large number of tubes from a number of racks of sockets. Both of these practices tend to result in bending of the leads 7 during removal of the tubes especially when the tubes are of the miniature type and the leads are thin and substantially easily bent. Therefore, it is desired to provide means for avoiding bending of the leads 7 by insuring that the tube 5 will be removed vertically out of the socket, at least until the leads are free of the receptacles 4. This I accomplish with my device 9. The cylindrical bore 11 therein is just slightly larger in diameter than the outer diameter of the envelope 6 of the tube 5. As a result, any substantial lateral movement of the tube 5 during removal from the socket is prevented. Thus the operator can remove the tube only by moving it substantially vertically from the socket. Additionally, my member 9 is constructed so that the cylindrical bore 11 is of such length that it will be effective for vertically guiding and preventing any substantial lateral movement of the tube until the leads 7 thereof are pulled completely free of the receptacle 7, in the manner shown in dot and dash lines in Fig. 2. This feature of my invention is also effective for increasing the number of tubes an operator can process in a given period since it precludes the need for affording any particular consideration to the tube leads and enables the operator to remove the tubes quickly and unhesitatingly with one continuous upward movement.

It will be seen that the member 9 is adapted for being

secured to and modifying a socket 1 already in use. Thus it is possible to obtain the advantages of my invention without the expense of providing new sockets, which could be considerable when the sockets 1 are already in use in large numbers. However, it will be further seen that the member 9 could be formed integrally with the socket 1 which might be preferable if there were not a large number of sockets on hand and no additional expense would be involved, as when new tube processing racks are being set up.

While I have shown and described a specific embodiment of my invention, I do not desire my invention to be limited to the particular form shown and described, and I intend by the appended claim to cover all modifications within the spirit and scope of my invention.

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

An adapter member for use with an electron tube socket having a plurality of elongated longitudinally extending receptacles designed to receive the elongated leads extending longitudinally from the base of a cylindrically-shaped electron tube envelope, said adapter member comprising a relatively thick walled piece of insulating material having a cylindrical bore extending therethrough which is in longitudinal alignment with said receptacles upon said member being secured to said socket, said thick walled adapter member being counter-sunk at the outer end of said bore to facilitate insertion of electron tubes into said bore with said bore being slightly larger in diameter than said tubes and being substantially longer from the bottom of the counter-sink to the inner end thereof than the length of said tube leads whereby insertion of the leads of the tube into the receptacles of the socket is facilitated and lateral movement of said tube is prevented during withdrawal of the tube from the socket until the leads thereof are completely withdrawn from the receptacles thereby avoiding bending of said leads, and means for securing said adapter member over said socket.

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