June 26, 1962 S. OFFERMAN 3,041,573

SOCKET WITH TUBE RETAINER

Filed June 11, 1959

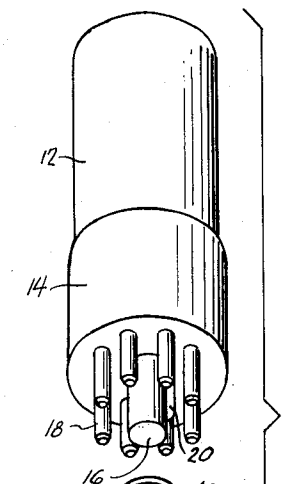


Fig. 1.

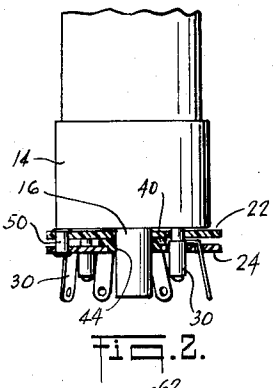


Fig. 2.

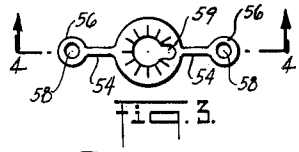


Fig. 3.

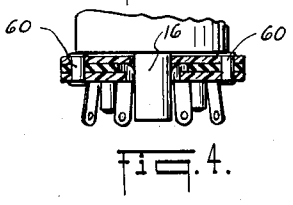
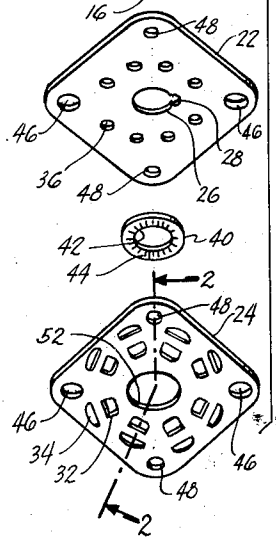


Fig. 4.



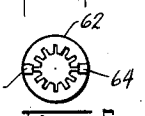


Fig. 5.

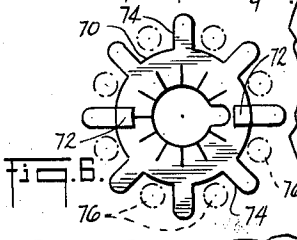


Fig. 6.

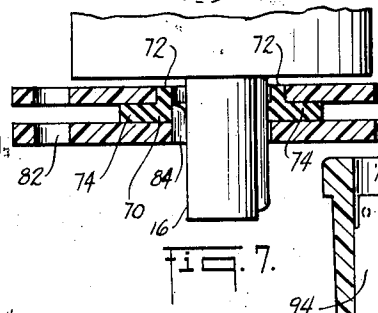


Fig. 7.

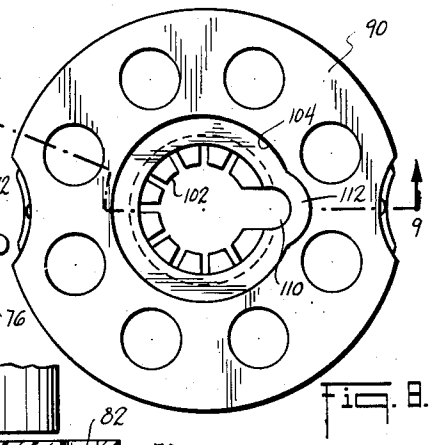


Fig. 8.

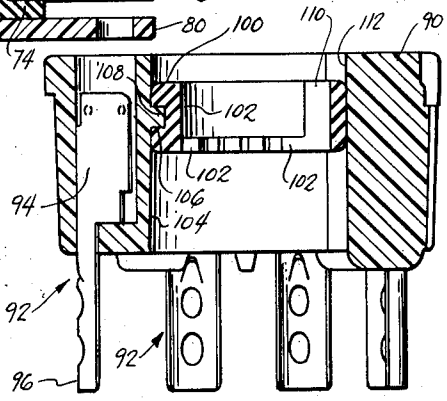


Fig. 9.

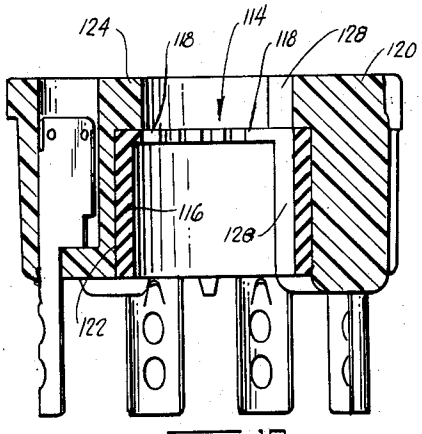


Fig. 10.

INVENTOR

SEYMOUR OFFERMAN

BY James and Franklin

ATTORNEYS

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SOCKET WITH TUBE RETAINER

Seymour Offerman, New York, N.Y., assignor to Industrial Electronic Hardware Corp., a corporation of New York

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6 Claims. (Cl. 339—93)

This invention relates to sockets for electron emission tubes, and for other components having pins for connection purposes, hereinafter for convenience called simply "radio tubes."

The primary object of the present invention is to generally improve sockets of the specified character. A more particular object is to provide means to help retain a tube in the socket even though subjected to vibration or shock which may tend to dislodge the tube from the socket.

Heretofore tube retainers have included means bearing down on top of the tube, or gripping the tube base, or gripping the tube envelope. Another object of the present invention is to provide a tube retainer which forms an inconspicuous part of the socket as made and sold by the socket manufacturer, so that the radio or television manufacturer using the socket has no problem beyond securing the tube socket to the chasses or printed circuit board, and this is done in the usual way.

To accomplish the foregoing general objects, and other more specific objects which will hereinafter appear, my invention resides in the socket and tube retainer elements and their relation one to another as are hereinafter more particularly described in the following specification. The specification is accompanied by a drawing in which:

FIG. 1 is an exploded view showing the parts of a laminated socket embodying the invention, and an octal tube received thereby;

FIG. 2 is a section through an assembled laminated socket, taken approximately in the plane of the line 2—2 of FIG. 1;

FIG. 3 is a plan view of a modified retainer for use in a laminated socket;

FIG. 4 is a section through an assembled socket, taken in the plane of the line 4—4 of FIG. 3;

FIG. 5 is a plan view of still another retainer having locating lugs;

FIG. 6 is a plan view drawn to enlarged scale and showing a retainer having radial spokes as well as locating lugs;

FIG. 7 is a section through a laminated socket embodying the retainer of FIG. 6, said section being taken through the chassis mounting holes;

FIG. 8 is a plan view of a molded socket embodying a retainer, with the metal contacts omitted;

FIG. 9 is a section taken approximately in the plane of the line 9—9 of FIG. 8; and

FIG. 10 is a similar section through a molded socket embodying a different form of retainer.

Referring to the drawing, and more particularly to FIGS. 1 and 2, the socket there shown is for a radio tube 12, the insulation base 14 of which has a center post 16 made of insulation, and a ring of metal pins 18 around the post 16. The post is keyed at 20 to ensure proper orientation of the tube when inserted in the socket. In the present case, there are eight pins, and the tube is known as an octal tube.

The socket comprises a rigid insulation base 22, 24 having a center hole 26 to receive the center post 16. This hole is notched at 28 to receive the key 20. The insulation base carries a ring of metal contacts 30 shown in FIG. 2 but which have been omitted in FIG. 1. The contacts comprise a pin-grip portion to receive one of the pins 18 of the tube, and a soldering lug portion or so called "tail" to which a wire may be soldered. These

parts are connected by a bridge which is disposed between the laminations, thereby anchoring the metal contacts in the base. Referring to FIG. 1, the pin-grip portions pass through an inner ring of holes 32 in the lower wafer 24, while the tails pass through an outer ring of holes 34. The upper wafer 22 has one ring of holes 36 which holes receive the pins of the tube, and which are in alignment with the inner holes 32 of the lower wafer.

In accordance with the present invention, the socket further comprises a tube retainer 40 which is made of yieldable material, and which is secured in the base at the hole 26. This retainer has a hole 42 which is smaller in diameter than the center post 16 of the tube, and there are a plurality of radial fingers 44 which bend as the center post is inserted, as shown at 44 in FIG. 2, and which resist reverse movement. The retainer may be made of rubber, or neoprene, or other rubber-like material. The fingers are preferably formed by a plurality of radial slits, so that the retainer may be cut out of sheet material.

Reverting to FIG. 1, the wafers 22, 24 of the laminated socket are usually diamond-shaped, as shown, to provide ears for holes 46, which serve later for mounting the socket on a chassis. The intermediate corners provide shorter ears having holes 48 through which small assembly eyelets are passed to lock together the parts of the socket. One such eyelet is shown at 50 in FIG. 2. It will be evident that with the present construction, the retainer 40 is held in position between the wafers by the same eyelets 50 as are anyway required for assembly of the socket. The retainer is squeezed and gripped between the wafers.

In FIG. 1 the center hole 52 of the lower wafer is enlarged to facilitate downward bending of the radial fingers of the retainer, and thus differs from hole 26 in the upper wafer which preferably mates with the center post of the tube.

A modified form of retainer is shown in FIG. 3, this differing in the addition of oppositely projecting arms 54 which are enlarged at 56 and have holes 58. The latter are spaced to register with the assembly holes 48 previously referred to. Also, the retainer is notched at 59 to receive the key of the tube. In other respects the socket may be like that previously described. During assembly the eyelets 60 pass through the upper and lower wafers and also through the holes 58 of the retainer, thus locking the retainer in position. As before, the center hole through the lower wafer (but not the upper wafer) is enlarged to facilitate downward bending of the radial fingers of the retainer, which then grip the center post of the tube.

Referring now to FIG. 5, the retainer 62 there shown differs from the retainer 40 in FIG. 1 in having a pair of lugs 64 which project in axial direction. One of the wafers, in this case the upper wafer, has mating notches to receive the lugs 64 in order to fix the location of the retainer relative to the wafers.

This retainer also differs slightly in having slots or notches of appreciable width between the radial fingers. It will be understood that the retainers of FIGS. 1, 3 and 6 similarly may have slots or notches instead of radial slits and, conversely, FIG. 5 may have slits.

The retainer 70 shown in FIGS. 6 and 7 is like that shown in FIG. 5 in having lugs 72 which project in axial direction. It also has radial projections or spokes 74 which are located to come between the metal contacts which receive the tube pins. The location of the pins and/or contacts is schematically indicated in broken lines at 76.

In FIG. 7 the upper and lower wafers are shown at 78, 80 with mounting holes at 82, this section being taken as though through the holes 46 of FIG. 1. A section perpendicular to that shown in FIG. 7 would show

the two assembly eyelets as in FIG. 4. The radial projections or spokes are shown at **74**, and the lugs which project in axial direction are shown at **72**. These are received in mating notches in the upper wafer **78**, and they serve to hold the retainer in proper orientation as well as location. The downward bend of the radial fingers which grip the center post **16** of the tube is shown at **84**.

As so far described the socket has been of the laminated or wafer type. However the invention is also applicable to sockets of the molded type, and referring to FIGS. 8 and 9, I there show a socket comprising a rigid molded insulation base **90** having a ring of metal contacts **92** (FIG. 9) to receive the pins of the radio tube. For this purpose each contact has a pin-grip portion **94**, and a connection portion or tail **96**. The tails may be designed either for use with printed circuitry, or for use with wired circuitry. This applies also to other sockets.

The tube retainer **100** is a somewhat tubular member having an inside diameter **102** which, for most of its length, is substantially larger than the diameter of the center post of the tube. However, this tubular member has radial fingers **102** which project inwardly at one part, in this case at the lower end, to a diameter smaller than that of the center post. These fingers with the slots or notches therebetween are visible in FIG. 8 as well as FIG. 9. In FIG. 8 the metal contacts **94** have been omitted.

As before, the retainer **100** is made of rubber or neoprene or other plastics material having somewhat the characteristics of rubber in respect to flexibility or yield.

The molded base **90** of the socket has a center passage **104** therethrough which is large enough to receive the retainer **100**. The socket also means securing the retainer in the base, and in the present case this comprises a peripheral channel **106** around the retainer **100**, this channel receiving a mating peripheral ledge or bead **108** extending around the inside of the passage **104**. Both the retainer and the passage through the socket are enlarged somewhat as shown at **110**, **112** in FIG. 8 to receive the key of the center post of the radio tube. At that point the bead **108** (FIG. 9) is interrupted.

Another form of molded socket may be described with reference to FIG. 10, which is a section similar to FIG. 9. However in this case the retainer **114** is a bushing-like member, and the hole **116** through the retainer for most of its length is larger than the center post of the tube. There are inwardly directed radial fingers **118** at one part of the retainer, in this case the upper end, and these fingers project inward to a diameter smaller than that of the center post.

The base **120** is a molded insulation base having a center passage **122** which is large enough to receive the retainer **114**, except at the end **124** where the center passage is dimensioned and keyed to fit the center post. In this case the means securing the retainer to the socket is a cement or ahesive applied between the outside of the retainer and the inside of the base.

As before, the retainer may be enlarged at **126** in alignment with the keyway **128** to better receive the key of the center post of the tube.

In other respects the molded socket may be conventional, and such sockets are made in a variety of exterior configurations, and make use of metal contacts of varied type. However, in all cases the socket will include a retainer made of a yieldable or rubber-like material having inwardly projecting fingers which come to a diameter smaller than that of the center post, and which are adapted to bend downward on insertion of a tube, and to then resist reverse movement of the tube.

It will be understood that while it is convenient to assume that the tube and socket are used in upright position when referring to upper and lower wafers and in related descriptive matter, such words are intended to be taken in a relative sense, for it is common practice to mount tubes in horizontal or even inverted position. Indeed, the retainer means of the present invention is of greater value and greater importance when the tube is not used in upright position.

It is believed that the construction and method of use, as well as the advantages of my improved socket, will be apparent from the foregoing detailed description. It will also be apparent that while I have shown and described the invention in a number of preferred forms, changes may be made in the structures shown without departing from the scope of the invention, as sought to be defined in the following claims.

I claim:

1. A socket for a radio tube having a center post and a ring of pins around said post, said socket comprising a rigid insulation base having a center hole to receive the center post of the tube, a ring of metal contacts to receive the pins of the tube, and a tube retainer made of a relatively soft yieldable material secured in said base at said center hole, said retainer having a plurality of independently movable radial fingers which bend as the center post is inserted and which resist reverse movement, said retainer being a somewhat tubular member having an inside diameter for most of its length which is substantially larger than the diameter of the center post, said radial fingers projecting inwardly at one part of the retainer to a diameter smaller than that of the center post, the base of the socket being a molded base having a center passage large enough to receive the retainer therein, and means securing the retainer in the base.

2. A socket as defined in claim 1, in which the retainer is a grommet-like member, and in which the means securing the retainer in the base comprises a peripheral channel around the retainer receiving a mating peripheral ledge or bead around the inside of the passage through the base.

3. A socket as defined in claim 1 in which the retainer is a bushing-like member, and in which the base has a center passage large enough for most of its length to receive the retainer, one end of the center passage being stepped inward to hold the retainer against movement toward the said end, said stepped end being dimensioned to pass the center post.

4. A socket for a radio tube having a keyed center post and a ring of pins around said post, said socket comprising a rigid insulation base, having a center hole to receive the center post of the tube, a ring of metal contacts to receive the pins of the tube, and a tube retainer made of a yieldable rubber-like material secured in said base at said center hole, said retainer having a plurality of radial slits forming independently movable radial fingers which bend as the center post is inserted and which resist reverse movement, said retainer being a somewhat tubular member having an inside diameter for most of its length which is substantially larger than the diameter of the center post, said radial fingers projecting inwardly at one part of the retainer to a diameter smaller than that of the center post, the base of the socket being a molded base having a center passage large enough to receive the retainer therein, and means securing the retainer in the base, said retainer having a keyway which receives the key of the center post.

5. A socket as defined in claim 4, in which the retainer is a grommet-like member, and in which the radial fingers project inwardly at one end of the retainer, and in which the means securing the retainer in the base comprises a peripheral channel around the retainer receiving a mating peripheral ledge or bead around the inside of the passage through the base.

6. A socket as defined in claim 4 in which the retainer is a bushing-like member, and in which the radial fingers are disposed at one end of the retainer, and in which the base has a center passage large enough for most of its

length to receive the retainer, one end of the center passage being stepped inward to hold the retainer, against movement toward the said end, said stepped end being dimensioned to pass the center post and having a keyway to pass the key of the center post, and said retainer being secured in said base by the use of a cement or adhesive.

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