

April 26, 1932.

F. R. RICHARDZ

1,855,729

TUBE SOCKET

Filed Sept. 19, 1927 3 Sheets-Sheet 1

Fig. 1.

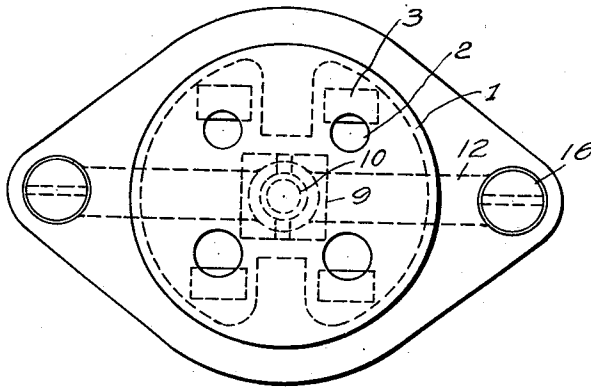


Fig. 2.

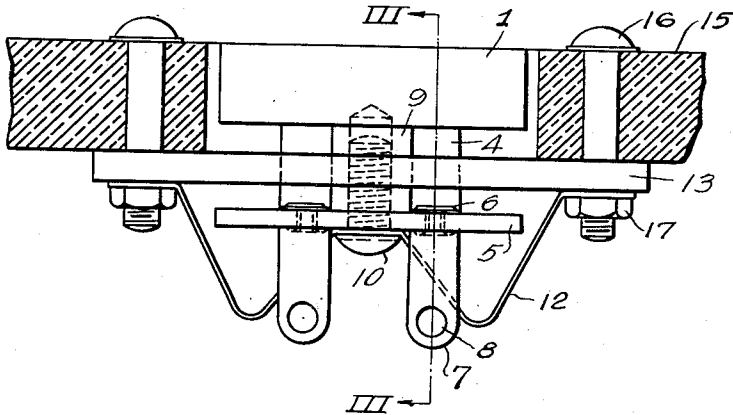
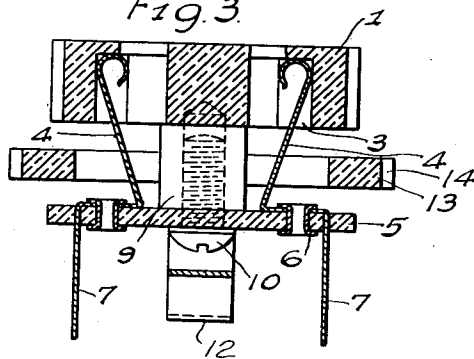


Fig. 3.



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Fig. 4.

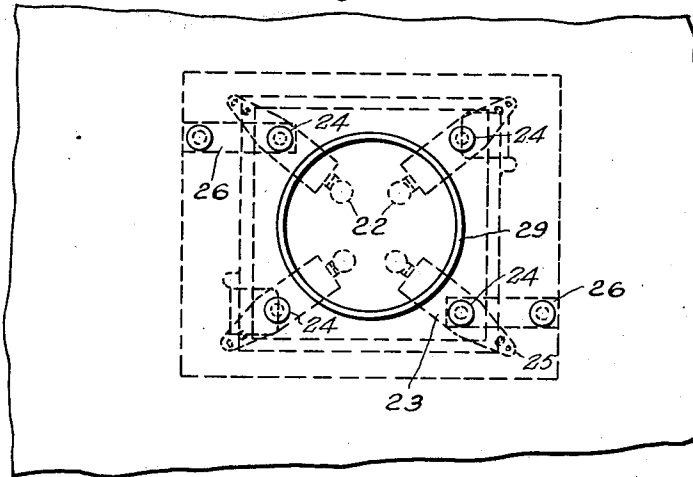


Fig. 5.

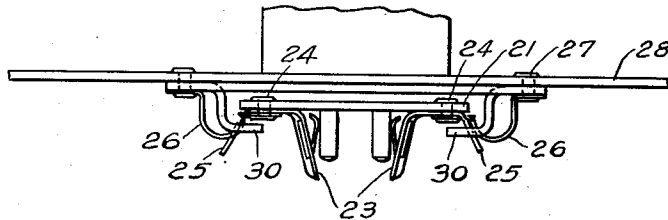


Fig. 6.

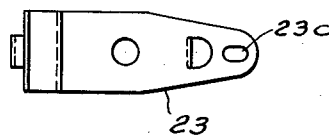
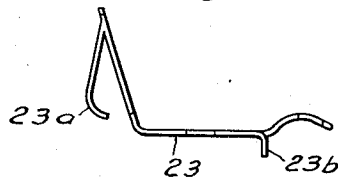


Fig. 7.



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Fig. 10.

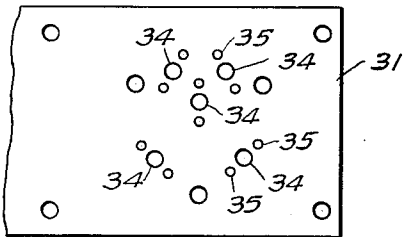


Fig. 11.

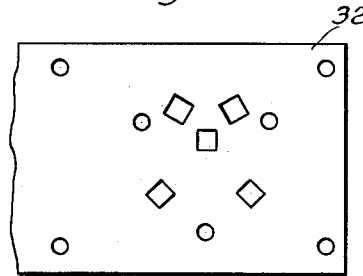


Fig. 8.

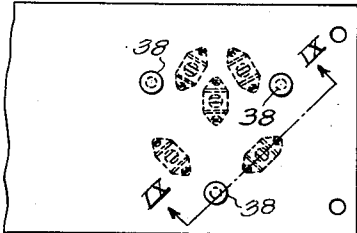


Fig. 12.

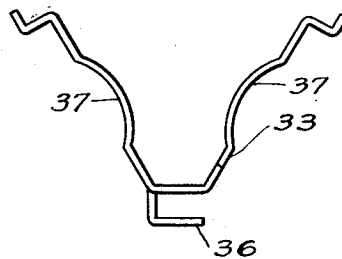


Fig. 9.

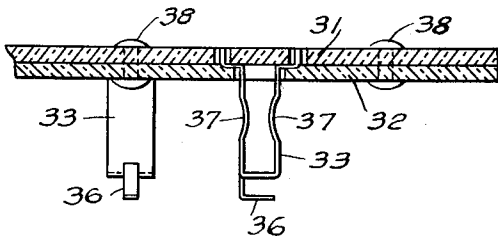
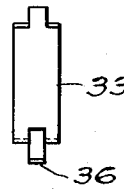


Fig. 13.



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TUBE SOCKET

Application filed September 19, 1927. Serial No. 220,588.

My invention relates to sockets for mounting electrical apparatus such as electron relays for which a flexible support is desirable.

One object of my invention is to devise a support for electrical apparatus such as radio tubes which shall protect them from mechanical shocks and jars.

Another object of my invention is to provide a non-microphonic mounting for electron relays and similar apparatus which shall not appreciably transmit vibration from bodies external thereto.

A further object of my invention is to provide a non-microphonic support for radio tubes which may be manufactured cheaply and readily, in the large quantities required for commercial production.

Other objects of my invention will become apparent on reading the following specification taken in connection with the appended drawings wherein

Figure 1 is a plan view of a flexible support embodying the principles of my invention,

Fig. 2 is a view in elevation thereof,

Fig. 3 is a sectional view taken along the lines III—III of Fig. 2.

Fig. 4 is a plan view of a flexible support embodying a modification of my invention,

Fig. 5 is an elevational view of the same modification,

Figs. 6 and 7 are detail views of a contact member which may be employed in the socket shown in Figs. 4 and 5,

Fig. 8 is a plan view of a radio tube support embodying still another form of my invention,

Fig. 9 is an elevational view of the same support,

Fig. 10 is a detail view of a plate of insulating material adapted to form part of the structure of the modification of my invention shown in Figs. 8 and 9,

Fig. 11 is a detail view of another plate of insulation adapted to cooperate with that shown in Fig. 10,

Fig. 12 is an elevational view of a contact member used in the modification shown in Figs. 8 and 9, and showing the same before installation in position therein, and

Fig. 13 is an elevational view of the same contact member taken at right angles to that of Fig. 10 and showing said member as finally installed in place.

The cathode filaments of ordinary radio detectors and amplifiers are of a relatively delicate character and are readily ruptured when the panel on which they are supported is subjected to mechanical shock and jar. Furthermore, the electrodes of such tubes commonly possesses considerable elasticity and it is found that mechanical vibrations emanating external to the tubes are readily transmitted through the mounting sockets of the prior art to these electrodes, and that they have an effect on the current flow through the tubes, of such a character that current variations of corresponding frequency will be produced in the output circuits. Since, usually, such radio tubes are connected in amplifiers, these current variations are magnified many-fold and frequently are reproduced in the telephone receiver or loud speaker, which is arranged to transform the electrical variations into sound in such force that the distributing noises drown out the signals being received.

In accordance with my invention, these difficulties are overcome by mounting the radio tube in a socket which is supported from a sub-base which supports the electrical line terminals, and which is, itself, supported on an extremely flexible spring of peculiar shape, from the panel on which it is desired to mount the tube. By this means, it has been found possible to prevent any breakage of the filament from mechanical shocks of ordinary magnitude to the mounting panel, and also to prevent the transmission of mechanical vibrations in any appreciable amount from the panel to the tube.

With the foregoing objects and results in mind, a specific structure embodying my invention is shown in Figs. 1, 2 and 3 in which a socket member 1 is provided with holes 2, adapted to receive the prongs of a conventional radio tube type, well known in the art. Each of the holes 2 is provided with a recess 3 at one side thereof which extends from the lower face of the socket, as shown in Figs. 2

and 3, nearly to the upper face thereof. In each of the recesses 3, is inserted the end of a spring member 4 which may be of phosphor bronze and which is affixed at its other end to a sub-base 5 by means of rivets 6. The end of member 4 may project downward from rivet 6 and act as a terminal 7 and may have a hole 8 or soldering lugs at the lower end thereof to provide a convenient soldering connection for line conductors.

The socket member 1 is rigidly supported from the sub-base 5 by means of a pillar 9 which may be an integral projection from member 1. Sub-base 5 may be fixed to pillar 9 by a screw 10.

The sub-base 5 is supported on a re-entrant spring 12 to which it is fastened by the screw 10 in a manner which will be sufficiently evident from Figs. 2 and 3. The two ends of the spring 12 are fastened to an annular plate 13 which may be of insulating material and which is provided with screw holes 14, by means of which it may be supported on any desired panel 15 by a convenient means such as bolts 16 and nuts 17.

The spring 12 may conveniently be referred to as having the shape of the letter W and for ordinary detector tubes may conveniently be made of phosphor bronze strips approximately 0.03 centimeters thick by 0.64 centimeters wide and 8.5 centimeters long. I have found the relative proportions and angles shown in Fig. 2 to work acceptably. The flexibility of the support, afforded by a spring of this description, has been found to be such that ordinary shocks and jars occurring to the panel 15, will not break the filament of an ordinary detector, and the transmission for sound waves of the aggregate structure is sufficiently low so that no appreciable microphonic noises are caused to emanate from the electrical circuits of the tube.

Referring particularly to Figs. 4 and 5 which show another modification of my invention, a plate 21 of any suitable insulating material is provided with holes 22, properly spaced to receive the terminal pins of a radio tube. Contact springs 23 of the form shown in detail in Figs. 6 and 7 may be affixed to the plate 21 by rivets 24 in proper position to engage the pins of a radio tube projected through the holes 22. Wires to be connected to the external circuits may be soldered to the connecting lugs 25 on springs 23.

Springs 23 may be stamped from bronze or other suitable metallic sheet. The tongues 23a and 23b are pressed outward from the body of the metal, and a hole 23c may be provided to facilitate connection of lead wires.

The plate 21 is supported by means of U-shaped springs 26 from rivets 27 in a main panel 28 upon which it is desired to mount the tube. This panel is provided with a circular hole 29 of sufficient size to receive the base of the radio tube and to permit it to

move freely without rubbing. The springs 26 may be of phosphor bronze ribbon approximately 0.03 of a centimeter thick by 0.64 centimeters wide and may be attached to diametrically opposite corners of the plate 21. At the two other corners of plate 21 may be attached stop members 30 which will limit the downward movement of plate 21 and permit the radio tube to be pushed home in its socket.

Figs. 8 to 13 show in detail still another modification of my invention. Referring particularly to Figs. 8 and 9, a radio tube support may be made by combining an upper plate 31 shown in detail in Fig. 10 and a lower plate 32 shown in detail in Fig. 11 with a spring contact member 33 shown in detail in Figs. 12 and 13.

The upper plate 31 is provided with five holes 34, the centers of which have the same spacing as the contact pins of a five-pin radio tube base. Each hole is flanked by a pair of diametrically opposite smaller holes 35. The lower plate 32 is provided with rectangular holes similarly spaced to the holes 34. The contact spring 33 is punched from phosphor bronze sheets which may be approximately 0.03 of a centimeter thick and 0.64 centimeter wide by 3.8 centimeters long. These are pressed up to the form shown in Fig. 12, the portion 36 being a tongue pressed downward from the middle portion of the strip. This is designed to act as a soldering lug to which lead wires may be connected.

The socket as shown in Figs. 8 and 9 may be assembled by inserting the spring 33 in the holes in the lower sheet 32 in the position shown in Fig. 9. The upper sheet 31 is then placed in position, thus retaining the spring 33 in position between the two sheets. The spring 33 is so proportioned that the distance between the curved portions 37 is less than the diameter of the pins of a radio base. When the latter is pushed home in this socket, therefore, good contact between the pins and the spring member 33 is assured. The plates 31 and 32 may be held together by rivets 38 or by any other suitable means.

While in accordance with the requirements of the patent statutes, I have described one practical embodiment of my invention, it will be evident that many modifications thereof may be made without departing from the principles which I have disclosed. I, therefore, desire that the claims should be limited only by their expressed terms and by the scope of the prior art.

I claim as my invention:

1. In a vacuum tube mounting, means for holding a vacuum tube, resilient means adapted to make contact with the sides of the terminals of said tube and connected to line terminals upon said holding means, a panel having an opening in alignment with said holding means and a flat ribbon spring of substantially U-shape mounted underneath

the panel and connected at one end to the underside of said panel and at its other end to said holding means, the broader face of said ribbon being perpendicular to the plane of said U.

2. In a vacuum tube mounting, means for holding a vacuum tube, resilient means adapted to make contact with the sides of the terminals of said tube and connected to line terminals upon said holding means, a panel having an opening in alignment with said holding means and a plurality of flat phosphor bronze ribbon springs of substantially U-shape mounted underneath the panel and connected at one end to the under side of said panel and at their other ends to said holding means, the plane of said U being normal to the wider face of said ribbon.

3. In a vacuum-tube mounting, a panel having an opening therein adapted to receive the base of a tube, a plate of insulating material located beneath said opening and having perforations therein adapted to receive the terminals of said tube, resilient means on said plate adapted to make contact with the sides of the terminals of said tube, a plurality of flat-ribbon springs of substantially U-shape beneath said panel and connected at one end to said panel and at their other ends to said plate.

4. In a vacuum-tube mounting, a panel having an opening therein adapted to receive the base of a tube, a plate of insulating material located beneath said opening and having perforations therein adapted to receive the terminals of said tube, resilient means on said plate adapted to make contact with the sides of the terminals of said tube, a pair of flat-ribbon springs of substantially U-shape connected at one end to said panel and at their other ends to said plate at opposite ends of an axis of symmetry thereof.

In testimony whereof, I have hereunto subscribed my name this 10th day of September, 1927.

FOLKE R. RICHARDZ.

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