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C. H. SUNDELL

2,439,589

SOCKET CONNECTION FOR RADIO TUBES

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FIG. 1.

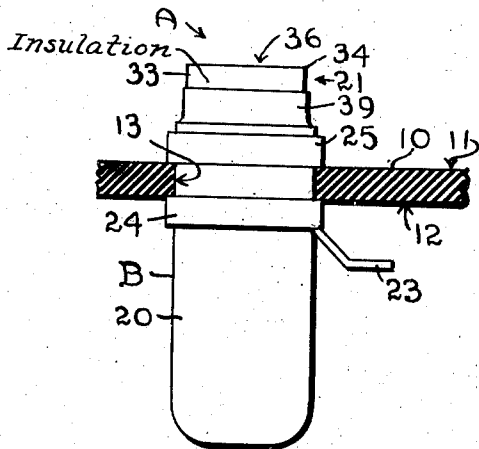


FIG. 2.

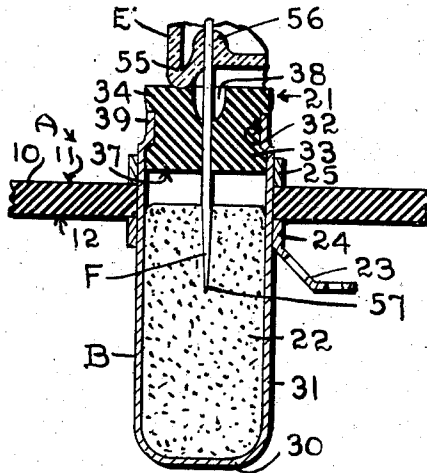


FIG. 3.

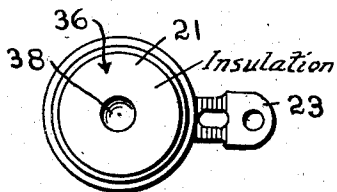


FIG. 4.

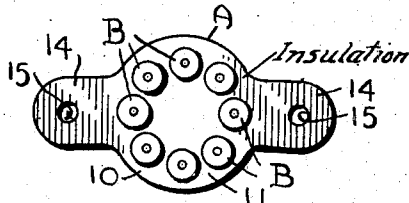


FIG. 6.

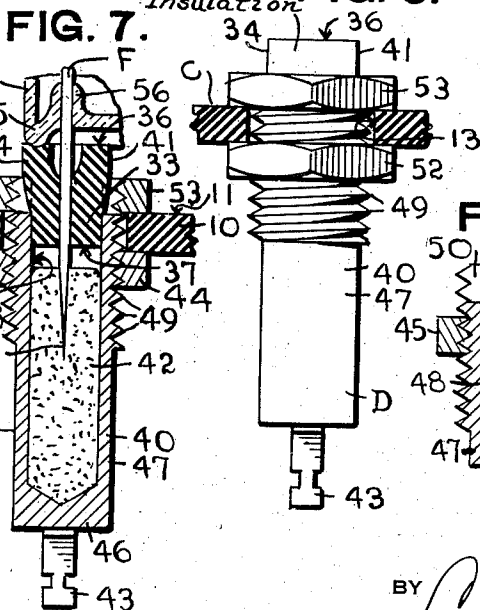


FIG. 5.

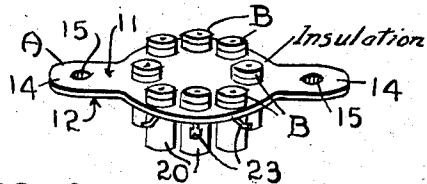


FIG. 9.

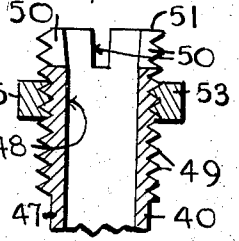
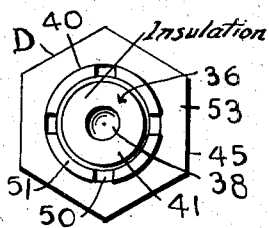


FIG. 8.



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SOCKET CONNECTION FOR RADIO TUBES

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1 Claim. (Cl. 173-328)

1

This invention relates to socket connections for radio tubes, and more particularly to such a device in which an electrical connection means other than prongs and spring metal clips is provided.

Spring metal clips, movable in suitable openings in sockets of electrical connections are common but they and the sockets have inherent defects. The clips are subject to breakage during insertion and withdrawal of the prongs, are apt to become worn and result in poor electrical conductors, due to oxidation of the worn surfaces, and may become rusted and cause adhesion of the prongs to the clips. The sockets, housing such clips, must, of necessity, have openings to the surface for insertion of the prongs, and these openings are apt to collect dust, rosin, metallic particles and the like. Conventional sockets require that a suitable base be attached to the glass envelope, and this entails an added expense in the construction of the tubes.

An important object of this invention is to provide a radio or like tube socket, free of clips, springs or similar movable parts.

Another important object is to provide a socket of this kind, having no permanent openings to the surface thereof from the electrical conducting metal within the socket.

Still another important object is to provide a socket of the class described, requiring no associated base added to the tube envelope.

In addition, an important object is to provide such a socket which will function as a shock absorber, even when the glass envelope itself comprises the tube base and this base contacts the socket.

Another object is to provide for the replacement of one of the individual pin or prong connection of the socket for another, instead of discarding the entire socket, and such replacement may be made without disturbing any of the other individual pin or prong connections of the socket.

Still another object is to provide such a socket, which will result in the reduction of the length of the interior leads, so that inductance will be cut down, an important advantage in some types of radio operation.

Yet another object is to provide a radio tube socket which functions, in part, as a cleaner of the prongs or pins as they are inserted into the socket, whereby dust, grease, oxide film or the like will be removed in the act of inserting the pins or prongs.

Other objects and advantages of this invention will be apparent during the course of the follow-

2

ing detailed description of the invention, taken in connection with the accompanying drawing, forming a part of this specification, and in which drawing all the figures except Figures 4 and 5 are enlarged views.

Figure 1 is a side elevation of an individual pin or prong socket.

Figure 2 is a vertical section thereof.

Figure 3 is a top plan of the same.

Figure 4 is a top plan of one assembly of individual pin sockets forming a complete tube pin socket.

Figure 5 is a perspective view of the showing in Figure 4.

Figure 6 is a side elevation modification of the individual socket of Figure 1.

Figure 7 is a vertical section of the socket of Figure 6.

Figure 8 is a top plan of the socket of Figures 6 and 7.

Figure 9 is a fragmentary section of the upper uncharged portion of the tube of Figures 6, 7 and 8.

In the drawing, wherein for the purpose of illustration is shown a preferred and a modified form of the invention and wherein similar reference characters designate corresponding parts thruout the several views, the letter A may designate the preferred tube pins socket as a whole, the letter B, the individual sockets thereof, C a modified form of the socket as a whole, D the individual sockets thereof, E the envelope of an electron discharge device, such as a radio tube, and F the conductor pin or prong thereof.

The novel socket A is made up of a suitable number of individual sockets B carried by a support 10 which is preferably a flat plate of suitable dielectric material, with upper face 11 and lower or bottom face 12, and provided with a plurality of spaced-apart perforations 13, one for each socket B, preferably arranged in a circle. The support 10 may have suitable opposite ears 14 provided with perforations 15 for fasteners for attaching the support 10 to a radio instrument or the like.

Each individual socket B comprises an open mouthed body portion, receptacle or housing 20, a closure 21 for the mouth, electrical current-conducting material 22 in the housing, a lead or terminal 23 extending from the housing and means 24 and 25 for securing the housing 20 to the support 10.

The housing 20 is, preferably, cylindrical, comprising a tube, closed by a bottom wall 30, and with its vertical walls 31 terminating in an up-

3

wardly-opening mouth 32. This housing is of any suitable electric-current conducting metal or metals, particularly metals or alloys not affected by metallic mercury.

Inserted into the mouth 32 is the closure 21 which may be a plug or stopper 33, but this plug 33 is more than a mere closure. It should be of soft, springy, compressible material, having dielectric properties. It must be a material which will permit a pin F to be readily inserted into and thru it but, when the pin is removed, the perforation, made by the pin, will close as the pin is being withdrawn. Soft rubber is preferred for the plug. The height of the plug is such that, when the plug is inserted into the mouth 32, the upper portion 34 thereof will project upwardly from the housing 20, the lower portion 35 will extend into the housing 20, and the distance from the upper face 36 to the lower face 37 of the plug is less than the length of the pin F, measured from where it projects from the envelope E to its free end, as shown in Figure 2. Extending downwardly into the portion 34 from substantially the axial center of the plug 33 may be a centering depression 38, for guiding the insertion of a pin F into the plug.

In order to secure the plug 33 to the housing 20, the upper end (or mouth portion) of the latter may be crimped, as at 39, to extend slightly into the side walls of the portion 34.

The electric-current conducting material 22 within the housing 20 may be any suitable mass having good electric current-conducting properties, such as metallic mercury, just so that a portion of the pin F is at all times in contact with the material 22. Of course, the height or volume of this material must be such that, at all times and in all positions of the socket A or sockets B, the material and inserted pin F will be in electric contact.

A suitable lead or terminal 23 is secured to the exterior of the housing 20, to project outwardly therefrom, as in Figures 1-3, and this lead 23 may be a lug integral with a ring, which forms the securing means 24. To the lead 23 may be soldered or otherwise secured a conductor, as is well known in the art.

This ring or means 24 not only supports the lug 23 but it also provides a shoulder, when suitably secured to the housing 20, as by friction, solder or the like, in contact with the lower face 12 of the support 10, to prevent or resist upward movement of the housing 20 thru the support 10, when a pin F is being withdrawn from the socket B. This ring and lug are, preferably, integral and of brass.

The means 25 may be a ring encircling and suitably secured to the upper end of the housing 10 below the crimped portion 39, and providing a shoulder in contact with the upper face 11 of the support, to prevent the housing 20 from dropping out of the support 10. Preferably, this ring clasps the housing 20 in the region of the lower end 37 of the plug 33 and aids in retaining the plug in place.

As to the modified form C of the socket as a whole, the support thereof is, preferably, similar in every respect to the support 10, and similar reference characters are employed in designating similar parts of both supports.

However, while the individual sockets D of the form C have many of the characteristics of the sockets B, it will be noted in Figures 6 to 9 that there are modifications. The modified form, however, comprises a housing, a receptacle or

4

body portion 40, a closure 41, electric-current conducting material 42, a lead or terminal 43, and means 44 and 45 for securing the housing 40 to the support 10.

While a, preferably, tubular, open-mouthed housing, body portion or receptacle 40, with bottom wall 46 and vertical side wall 47 terminating in an upwardly opening mouth 48, is provided, the upper end of the housing 40 has exterior screw threads 49 and suitable spaced apart vertical slots 50 extending from its upper edge 51 to permit the upper portion of the receptacle 40 to be initially flared out as shown in Figure 9.

Inserted into the mouth 48 is the closure 41 of suitable dielectric material, having the characteristics of the closure 21, and similar reference characters are employed for both closures 21 and 41. It will be noted, however, that the closure 41 may have downwardly-sloping walls, since it is preferred to provide a forced fit of this closure 41 with the housing 40. The closure 41 extends, as does the closure 21, upwardly beyond the mouth 48, as in Figure 7.

The electric current conducting material 42 is, preferably, similar to the material 22 and its height or volume should be such that, despite various positions of the sockets C and D, the material 42 will provide an electric current conductor between the pin F and housing 40.

In the modified form D there is shown, by way of example, a terminal or lead 43 suitably secured to the bottom wall 46 of the housing 40, as by soldering.

The means 44 and 45 for securing the housing 40 to the support 10 may be a pair of nuts 52 and 53 having screw threads for cooperation with the screw threads 49. The nut 52 is shown positioned in contact with the lower or under face 12 of the support 10, and the other nut 51, in contact with the upper face 11 of the support 10. Since the upper end of the housing 40 is initially flared out as shown in Figure 9, the nut 51, when screwed into place, acts to compress this end of the wall of the housing 40 about the closure or plug 41.

The envelope E of the electron discharge device, is shown as of glass with the glass base 55 of the device integral with the envelope and provided with an enlarged support 56 for a metallic pin F extending downwardly and outwardly of the base 55. The pin F is, of course, pointed, as at 57.

In use, when a suitable number of individual sockets B are arranged and attached to a support 10, to form a socket A, or a suitable number of individual sockets D are arranged and attached to a support 10 to form a socket C, as has been described, electron discharge devices may be removably attached to either socket A or C by inserting the pins F thereof into either the sockets B or D, as in Figures 2 and 7, whereupon, with suitable conductors attached to the leads or terminals 23 or 43, as the case may be, and a source of electric current provided, there will be a flow of electric current thru the individual sockets and electron discharge devices.

The pins F will readily penetrate both the plugs 21 and 41 and the material 22 and 42. Just as readily, the pins F may be withdrawn and as they are withdrawn, the perforations, made in the plugs 21 or 41 by the pins F, will close behind them, that is, before the pins F are wholly withdrawn, the lower ends of the perforations made, will have closed, so that neither air nor dust and the like will enter the housings 20 or 40, but none

5

of the material 22 or 42 will be spilled or lost. The plugs 21 and 41 will wipe the pins F of dust, dirt, rosin, oil or the like, as they are inserted and will wipe the pins F of material 22 or 42, as they are being withdrawn, yet the plugs will securely grip and retain the pins and parts attached to and associated therewith.

As seen in Figures 2 and 7, the glass base 55 rests directly upon the plugs 21 and 41 and is cushioned by these plugs so that, despite the economy of using devices with integral, glass bases and better functioning of such devices, devoid of separate, attached bases, the plugs function as closures, means for cleaning the pins F and cushions for the devices.

The form of invention disclosed in Figures 6 to 9 inclusive is particularly well adapted for use when it is desirable to provide a socket connection which may be readily dismembered for the replacement of parts, such as the closure 41 or for adding or substituting current conducting material 42.

Various changes may be made to the forms of the invention herein shown and described, without departing from the spirit of the invention or scope of the following claim.

What is claimed is:

In an electrical system including an electron discharge device of the type having a frangible base and a plurality of spaced-apart, substantially parallel, electric current-conducting pins extending from the base outwardly of the electron discharge device, a tubular housing of electric current-conducting material for each pin and defining a chamber having a mouth; a stopper of resilient, dielectric material for each housing, inserted into the mouth thereof and in intimate

6

contact with the inner surface of the tubular wall of the housing at only the mouth end thereof, each stopper projecting outwardly of the chamber in which it is inserted and having an outer face with a portion of said base, closely adjacent a pin, cushioned and resting upon said face and the adjacent pin extending through and in intimate contact with the stopper and projecting, from said stopper, into said chamber, said resilient material being characterized by immediately closing any openings, in said stoppers made by said pins, upon withdrawal of said pins; and a volume of fluent electric current-conducting material in each of said housings, sufficient in volume to contact the pin therein in any position in which the housing may be disposed.

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