

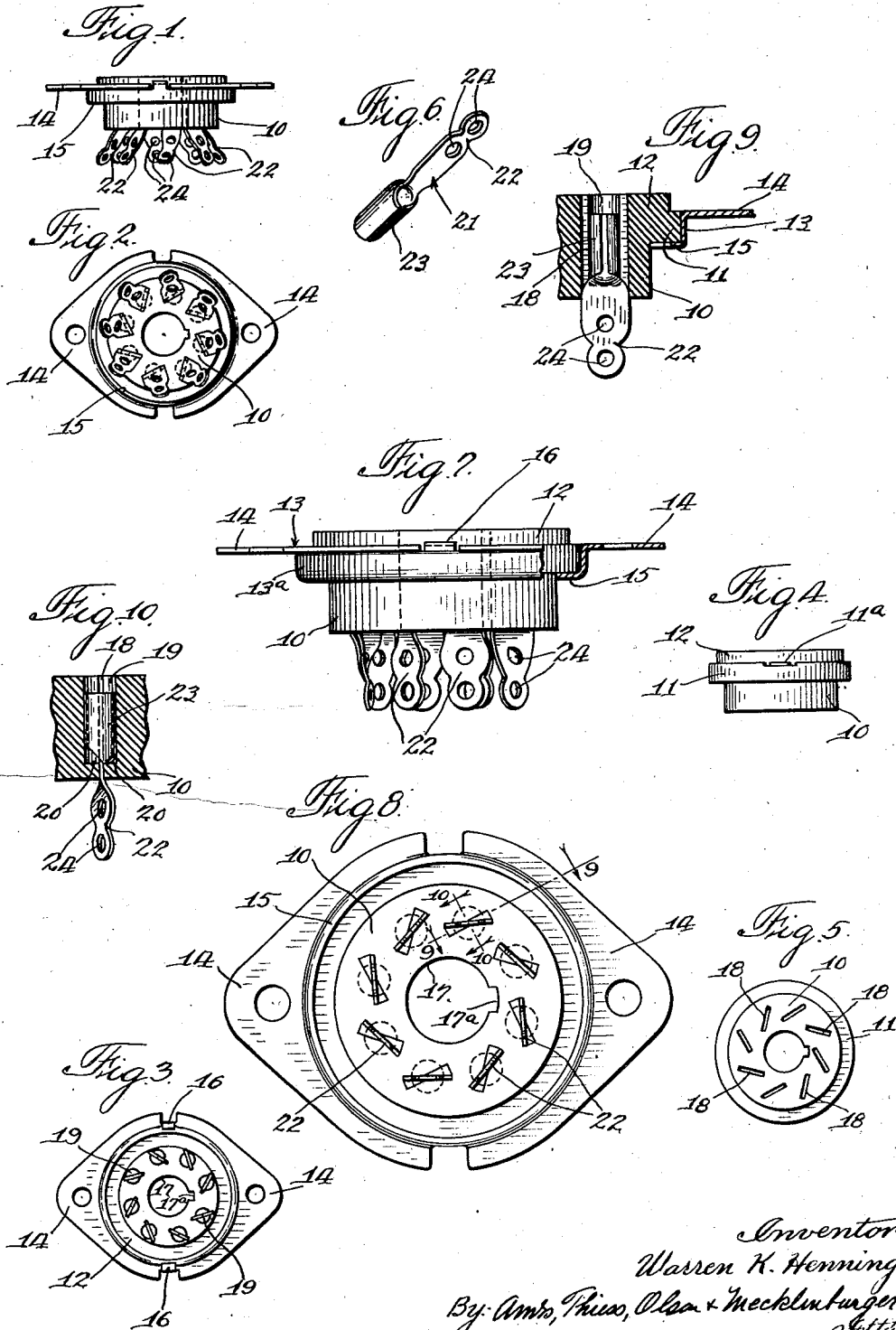
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SOCKET

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SOCKET

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6 Claims. (Cl. 173—328)

This invention relates to sockets, and more particularly to sockets such as are used in radio apparatus for holding electron tubes having pin terminals for the electrodes. Such sockets are used also as receptacles for cable terminal plugs, where the plug is provided with pins for making connection with the contacts of a suitable receptacle. The invention relates also to an improved contact member for radio sockets and the means whereby the contacts are retained in assembled relation to the insulating base or body of the socket.

One of the objects of the invention is to provide a socket which holds the tube or plug very securely and in which the engagement of each contact member with the corresponding pin terminal on the tube or plug is such as to surely and reliably maintain a low resistance electrical path between the pin terminal and the corresponding wiring terminal of the socket.

Another object of the invention is to provide a socket in which ample space is provided between the wiring terminals for convenience in wiring, although the contacts may be numerous and closely spaced, in accordance with the design of the tube, as determined by the manufacturer of the latter.

Another object of the invention is to produce a socket which is so designed as to be capable of receiving and providing the proper terminal connections for a small tube having a large number of pin terminals and which is also capable of affording ample security against short circuiting or cross connections between circuits.

Another object is to provide, in a radio socket, a construction which is simple in design, economical in manufacture, reliable in performance, and having a minimum number of easily assembled parts.

Further objects will be apparent from the specification and the appended claims.

In the accompanying drawing:

Figure 1 is a side elevational view of a socket, illustrating one embodiment of the invention;

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

Fig. 3 is a top plan view of the same shown in Figs. 1 and 2;

Fig. 4 is an elevational view of the insulating body or base of the socket;

Fig. 5 is a bottom plan view of the base;

Fig. 6 is an enlarged perspective view of one of the contact members before it has been inserted into the base and deformed to retain it in place;

Fig. 7 is an enlarged side elevational view showing a stage in the assembling of the socket, the contact members having been inserted in the openings in the base and locked in place by deforming them, but not yet bent outward to separate the terminals;

Fig. 8 is an enlarged bottom plan view of the embodiment shown in Fig. 7;

Fig. 9 is a detail sectional view on line 9—9 of Fig. 8; and

Fig. 10 is a detail sectional view on line 10—10 of Fig. 8.

Referring to the drawing in detail, the embodiment illustrated comprises a base or body 10 of the socket, preferably of molded insulating material such as bakelite. This base is shown before assembly in Figs. 4 and 5, and is provided with an enlarged annular rib or flange 11 and an upper portion 12 having a diameter somewhat less than that of the flange. In the assembled socket the base is secured to a stamped sheet-metal supporting member 13 which latter is formed with a depressed ring portion 13a and laterally extending wings 14, which are perforated for the passage of rivets or bolts for securing the socket in place preferably on the under side of the deck or panel of a radio receiver or the like. The ring portion 13a has its lower edge turned inwardly to form a shelf or ledge 15 extending under the flange 11 of the base 10. The base is secured in place in the ring by a pair of tongues 16, cut from the material of the ring 13 and bent in over the flange 11 of the base, and into shallow notches 11a, which prevents turning of the base in the ring and holds the base securely in position.

The socket shown in the drawing is designed to receive a type of radio tube in which the correct rotary positioning of the tube, and the consequent engagement of each of its pin terminals with the proper socket contact, is made certain by constructing the tube base with a central projection or plug which enters a corresponding opening in the socket before the pin terminals enter recesses in the socket which contain or permit access to the socket contacts, this tube projection and the corresponding opening in the socket being of such configuration that the projection can enter in but one position of rotary adjustment. The base 10 is therefore formed with a passage 17 extending centrally there-through. The passage 17 is of generally circular form and may be provided with a notch or groove 17a at one point for the reception of a spline or rib on one side of the locating plug on the tube

base. An opening of this form corresponds to and matches the locating plug on tubes which are in general use at the present time.

Arranged in a circle around the central opening in the base 10 is a series of openings which, when seen from the under side of the base, as in Fig. 5, appear as slots 18. These slots do not extend at right angles to radii of the base, but are inclined with respect to such radii. That is, they are preferably all tangent to a predetermined circle around the vertical axis of the base of smaller diameter than the diameter of the circle on which the openings are arranged. This is for a reason which will be pointed out hereinafter. Viewed from above, as in Fig. 3, these openings appear as circular apertures 19, crossed by slots. From an inspection of Figs. 9 and 10 it will be seen that the slots extend completely through the base, while the round part of each opening extends not quite through the base, thus leaving shoulders 20 at the lower end of the circular portion of the opening. Each of these openings contains a contact member for engagement with a corresponding pin contact on the radio tube.

As shown in Figs. 6, 9 and 10, each contact member consists of a blanked-out sheet metal member 21 having one end of greater width than the other and rolled or bent or otherwise formed into a split cylinder 23, the inside diameter of which is slightly less than the diameter of the pin terminal which it is to receive. The other end of the sheet metal member is left flat to form a wiring terminal or soldering lug 22 and has two holes 24 punched in it for the insertion of wires therein prior to the soldering operation by which the wires are secured. The cylindrical portion 23 constitutes the contact for engagement with the pin contact of the tube.

In the completed socket each of the small circularly disposed tangential openings in the base contains one of these contact members, the cylindrical portion occupying the upper, cylindrical part of the opening. In assembling the socket the flat end of the contact member is inserted in the upper end of the opening and the member pushed down until the cylindrical part of the latter abuts the shoulders 20, as seen in Figs. 9 and 10. The upper part of the flat portion, which remains in the slot, prevents turning of the member in the opening. The projecting part of the flat portion is then given a slight twist, as seen in Fig. 10. This distortion of the member effectively locks it in place and prevents it from being drawn out of its recess when a tube has been inserted in the socket and afterward withdrawn. Figs. 7 and 8 show the socket at this stage in the process of assembling it, the contact members having been inserted in their recesses in the base and twisted to lock them in place.

In order to increase the space between the wiring terminals and thus facilitate the making of the proper connections thereto the members may now be bent outward, away from each other, as seen in Figs. 1 and 2. This completes the operation of assembling the socket. It will be seen that if the slots 18 extended radially with respect to the base, bending of the soldering lugs would not separate them materially, and that if they were placed at right angles to radii of the base the contact members would be inconveniently crowded, and the likelihood of short-circuiting or cross connection between circuits would be much greater. The contacts cannot be placed farther from the center of the socket because the

pin contacts are located upon a circle the diameter of which is determined by the manufacturer of the tubes. The twisting of the flat portion is preferably in a direction tending to bring the outwardly extending lug portions more nearly in alignment with the radii of the socket after the lugs are bent outwardly, and to thereby increase the spacing of the soldering lugs.

When these sockets are employed in the construction of a radio receiver they are usually so placed that the circular top portion 12 of the insulating base of each socket projects up through a circular opening punched in the deck or panel of the receiving set, with the wings 14 of the sheet-metal member against the under side of the deck, and the device is then secured in place by rivets.

The contact members are adapted to grip the pin terminals of the tube very firmly and to reliably maintain low resistance electrical connections with the tube terminals. When a pin terminal of a tube is pushed into the cylindrical part 23 of a contact member this part of the member is forced to expand or open, to admit the pin, and maintains a firm grip thereon because of its resilience.

Modifications will be apparent to those skilled in the art and it is desired, therefore, that the invention be limited only by the prior art and the scope of the appended claims.

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

1. A tube socket comprising an insulating base having a contact-receiving opening therethrough and a contact and wiring terminal member formed of a single piece of sheet material shaped to provide a substantially cylindrical portion open along one side only for embracing and engaging a tube pin terminal and a flat wiring terminal portion extending from said cylindrical portion, said flat portion lying substantially in an axial plane through the cylindrical portion, said contact-receiving opening comprising a substantially cylindrical portion for receiving the cylindrical portion of said member, and a slot portion for receiving the flat portion of said member, said opening having a shoulder adjacent the junction of the slot portion with the cylindrical portion engaged by the contact portion of said member for limiting the distance of insertion of said member.

2. A tube socket comprising an insulating base having a contact-receiving opening therethrough and a contact and wiring terminal member formed of a single piece of sheet material shaped to provide a substantially cylindrical portion open along one side only for embracing and engaging a tube pin terminal and a flat wiring terminal portion extending from said cylindrical portion, said flat portion lying substantially in an axial plane through the cylindrical portion, said contact-receiving opening comprising a substantially cylindrical portion for receiving the cylindrical portion of said member, and a slot portion for receiving the flat portion of said member, said opening having a shoulder adjacent the junction of the slot portion with the cylindrical portion engaged by the contact portion of said member for limiting the distance of insertion of said member, said wiring terminal portion being bent below the slot to hold said member against withdrawal from said base.

3. A tube socket comprising an insulating base having a contact-receiving opening therethrough

and a contact and wiring terminal member formed of a single piece of sheet material shaped to provide a substantially cylindrical portion open along one side only for embracing and engaging a tube pin terminal and a flat wiring terminal portion extending from said cylindrical portion, said flat portion lying substantially in an axial plane through the cylindrical portion, said contact-receiving opening comprising a substantially cylindrical portion for receiving the cylindrical portion of said member, and a slot portion for receiving the flat portion of said member, said opening having a shoulder adjacent the junction of the slot portion with the cylindrical portion engaged by the contact portion of said member for limiting the distance of insertion of said member, the width of the flat portion of said member being greater than the diameter of the cylindrical portion, the length of said slot being greater than the diameter of the cylindrical portion of said opening, said cylindrical portion having longitudinally-extending grooves in its sides leading to the ends of said slot for guiding said flat portion in assembly.

4. A tube socket comprising an insulating base having a plurality of contact-receiving openings therethrough with their axes lying substantially in a cylindrical surface and a plurality of contact and wiring members, one for each opening, each member being formed of a single piece of sheet material shaped to provide a cylindrical portion open along one side only for embracing and engaging a tube pin terminal and a flat wiring terminal portion extending from said cylindrical portion, said flat portion lying substantially in an axial plane through said cylindrical portion, each contact-receiving opening comprising a substantially cylindrical portion for receiving the cylindrical portion of said member, and a slot portion for receiving the flat portion of said member, each opening having a shoulder adjacent the junction of the slot portion with the cylindrical portion engaged by the contact portion of said member for limiting the distance of insertion of said member, the width of the flat portion of said member being greater than the diameter of the cylindrical portion, the length of said slot being greater than the diameter of the cylindrical portion of said opening, said cylindrical portion having longitudinally-extending grooves in its sides leading to the ends of said slot for guiding said flat portion in assembly, the plane of said slot being non-perpendicular to a plane through the axis of said cylindrical surface and through the axis of the cylindrical portion of said

opening, whereby a substantial space is left between the adjacent edges of adjacent slots.

5. A tube socket comprising an insulating base having a plurality of contact-receiving openings therethrough with their axes lying substantially in a cylindrical surface and a plurality of contact and wiring members, one for each opening, each member being formed of a single piece of sheet material shaped to provide a cylindrical portion open along one side only for embracing and engaging a tube pin terminal and a flat wiring terminal portion extending from said cylindrical portion, said flat portion lying substantially in an axial plane through said cylindrical portion, each contact-receiving opening comprising a substantially cylindrical portion for receiving the cylindrical portion of said member, and a slot portion for receiving the flat portion of said member, each opening having a shoulder adjacent the junction of the slot portion with the cylindrical portion engaged by the contact portion of said member for limiting the distance of insertion of said member, the width of the flat portion of said member being greater than the diameter of the cylindrical portion, the length of said slot being greater than the diameter of the cylindrical portion of said opening, said cylindrical portion having longitudinally-extending grooves in its sides leading to the ends of said slot for guiding said flat portion in assembly, the plane of said slot being nonperpendicular to a plane through the axis of said cylindrical surface and through the axis of the cylindrical portion of said opening, whereby a substantial space is left between the adjacent edges of adjacent slots, each wiring terminal portion being twisted underneath the base adjacent the slot to hold the member in the recess and being bent to extend in a general radial direction outwardly to facilitate wiring.

6. A tube socket comprising an insulating base having an opening therethrough and an integral sheet metal contact and wiring terminal member, said opening comprising a contact-receiving portion and a slot leading from the contact-receiving portion to the under side of the base, said contact and wiring terminal member being insertable into said opening from the upper side of the base, said sheet metal member comprising a tongue extending from said contact through said slot, the contact-receiving portion of said opening having a longitudinally-extending groove in its side, said sheet metal member having an edge portion slidable in said groove in assembly for guiding said tongue into said slot.

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