Feb. 19, 1952 E. K. NAUTH 2,586,696

RADIO TUBE SOCKET MOUNTING

Filed Dec. 9, 1948

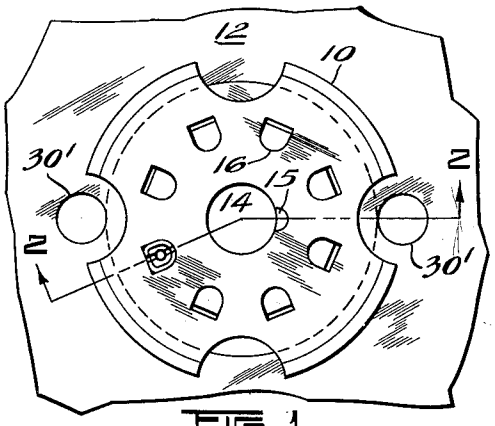


FIG. 1

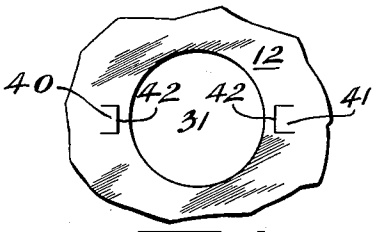


FIG. 4

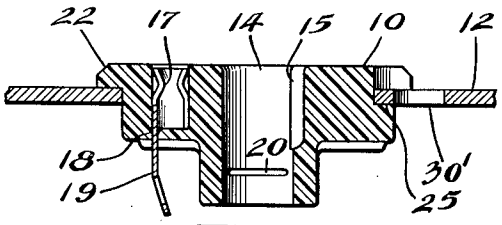


FIG. 2

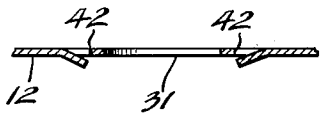


FIG. 5

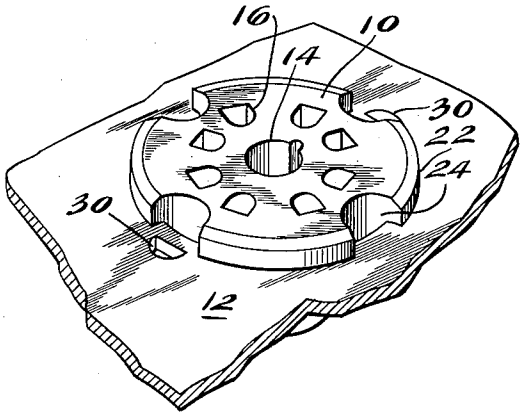


FIG. 3

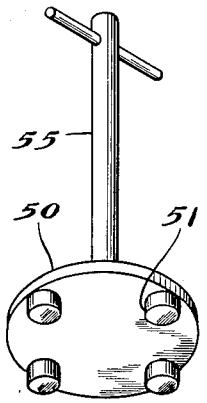


FIG. 6

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RADIO TUBE SOCKET MOUNTING

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4 Claims. (Cl. 173—339)

1

The present invention relates to sockets for plug-in electrical devices and is particularly directed to a novel form of socket construction which may be readily mounted on a sheet metal chassis.

An object of the present invention is the provision of a novel form of socket construction.

Another object of the present invention is to provide a socket for a plug-in electrical device which may readily be attached to a sheet metal chassis or mounting plate.

Still another object of the present invention is the provision of novel and inexpensive means for securing a socket for plug-in radio tubes to a chassis or metal mounting plate and which furthermore easily permits removal of the socket, if necessary.

The foregoing objects, and others which may appear from the following detailed description, may be attained, according to one aspect of the present invention, by providing a socket having a body in the form of a generally cylindrical molding of insulating material having an outwardly extending flange at one end thereof. The body may be provided with an axial aperture adapted to receive a locating and locking-in prong of a radio tube and a number of ancillary apertures regularly spaced about the central aperture and having their axes generally parallel to the central axis of the body. The ancillary apertures are so formed as to receive socket contact springs or clips which, during use of the socket, function to establish electrical contact with the connector prongs of the radio tube which is plugged into the socket. For purposes of illustration, the present socket arrangement has been shown and described as being particularly adapted to receive a lock-in radio tube, but it should be apparent that the invention is not limited thereto, but that by suitably arranging the size and arrangement of the contact clips and the apertures which receive them, tubes having any other conventional basing arrangement may be accommodated. Also, the size of the socket is not of essence in the present invention. The socket mounting means may as well be employed with sockets adapted to receive miniature or subminiature series of tubes as for the full size lock-in tube. Also, if desired, the socket may be adapted to cooperate with an electrical connector plug on the end of a cable of individual wires.

In order to secure the socket body in position in a sheet metal chassis forming a part of a radio set or in a separate small mounting plate for the socket I provide a number of longitudinal semi-

2

circular notches or recesses extending through the upper flange along the generally cylindrical part of the socket body a distance approximately equal to the thickness of the mounting plate material. Two, three, or four grooves, recesses, or notches, may be used. The mounting plate or chassis in which the socket is to be secured is preferably provided with an aperture having a diameter equal to that of the cylindrical part of the socket and through which the cylindrical part of the socket is inserted. At a number of points on the mounting plate or chassis is provided a number of D-shaped holes, or narrow slits. The number and spacing of said holes is such that they align with at least some of the notches in the socket body. Each hole has its major axis normal to the direction of the diametral line on which the holes are placed. Lanced out depressions near the circumference of the socket aperture may also be used. After the socket body is placed in the aperture of the chassis or mounting plate, the chassis material between the socket aperture and each of the adjacent holes is deformed into the semi-circular grooves in the sides of the socket body, thus maintaining the socket body securely in place. In order to facilitate the removal of the socket from the chassis or mounting plate, should such action be necessary, I have provided also a wrench or special tool having lugs adapted to engage the semi-circular grooves in the flange of the socket body. By applying such tool to the socket body and rotating it in either direction, the deformed portions of the chassis material in the semi-circular grooves are pressed outwardly away from the socket body thus restoring the circularity of the aperture in the chassis or mounting plate and permitting the ready removal of the socket.

The present invention will be more fully understood by reference to the following detailed description which is accompanied by a drawing in which:

Fig. 1 illustrates in plan view an embodiment of the present invention, while

Fig. 2 is a vertical section taken in the direction of the arrows 2—2 of Fig. 1,

Fig. 3 is a perspective view somewhat similar to the view of Fig. 1 with the exception that the socket securing holes have not yet been deformed to hold the socket in position,

Figs. 4 and 5 are plan and sectional elevational views respectively of a modified form of chassis punching adapted to receive the socket of the present invention, while

Fig. 6 is a perspective view of a special tool for

removing a socket from the chassis after it has been installed.

In Fig. 1, I have shown in plan view a socket body 10 mounted in a chassis or mounting plate 12. The mounting plate 12 may be either the chassis material of a radio set, or a separate small plate adapted to be separately screwed or otherwise secured to the chassis. The socket body 10 is preferably molded of some plastic insulating material. It contains a central aperture 14 having a groove 15 along one side. Aperture 14 and groove 15 are adapted to cooperate with the central locating lug of a plug-in radio tube, to assure correct orientation of the tube when plugging it into the socket. The socket is also provided with a number of apertures 16 regularly spaced on a circle concentric with the center of aperture 14. Apertures 16 are adapted to receive and retain socket clips 17 which make electrical contact with the connecting prongs on the tube when it is plugged into the socket.

While the present invention is not limited to any particular manner of securing contact clips 17 into their apertures 16, one way in which this may be done, is shown in more detail in Fig. 2. It will be seen that apertures 16 are blind, that is, they do not extend full size entirely through the socket body 10. Instead, they terminate in a narrow slit 18, which extends through to the rear of the socket body. The socket contact clip 17 has associated therewith a soldering lug 19, which passes through the narrow slit 18 and is so bent or twisted as to prevent the socket clip from leaving the aperture 16 as the tube is pulled out of the socket. If desired, in order to maintain the tube more securely in the socket, a detent spring may be clipped into the transverse saw slot 20 to engage in a corresponding notch in the locating lug of the tube for maintaining the tube in place. The socket body 10 has a generally cylindrical outside configuration except that it has an extending flange 22 at the upper end thereof. A number of semi-circular notches 24 are milled or otherwise formed in the outer surface of the socket, and through the extending flange 22. As shown at the right hand side of Fig. 2, the semi-circular notches 24 preferably extend below the lower surface of flange 22 a distance equal to the thickness of the metal of which the mounting plate or chassis 12 is constructed, and terminate in a flat shoulder or ledge 25.

Fig. 3 illustrates the socket molding 10 in the chassis 12 before it is secured in place. It will be noted that the chassis plate 12 is provided with a number of D-shaped apertures 30 located opposite a number of the notches 24. Where two or four notches 24 are used, the D-shaped apertures preferably lie on opposite extensions of a diametral line through aperture 31. The straight sides of D-shaped apertures 30 are arranged adjacent the aperture 31 and with their length transverse to said diametral line of hole 31. After the socket body 10 and the chassis plate 12 are placed together as shown in Fig. 3, a deforming tool, or a screw driver is inserted in D-shaped holes 30 and rotated, thus deforming the D-shaped holes into circular holes such as shown at 30' in Fig. 1. The portion of the chassis material between holes 30 and the socket body receiving aperture 31 is deformed into notches 24 as clearly shown in Fig. 2. If desired, a plier-like tool may have its jaws inserted into both holes 30 and closed to press the material between holes 30 and aperture 31 into notches 24. The deformed portion of the chassis material in the notches 24 rests against the flat bottom end or step 25 of each notch. It will be seen that downward movement of the socket body is prevented by the flange 22, upward movement is prevented by the deformed portion of the material in the notches 24, resting against steps 25, and rotational forces are resisted by the action of the deformed portions of the chassis material against the sides of the notches 24.

It is not necessary that the apertures 30 be D-shaped in form before being deformed; they may take the form of narrow slits, or, in order to facilitate the forming operations required in making a chassis, narrow U-shaped slits 40 and 41 as shown in Figs. 4 and 5 may be lanced into the chassis material. The tongues thus cut out of the chassis material are bent downward to a slight extent, just enough to give access to the linear edges 42 adjacent the central aperture 31, so that they may be squeezed toward each other to lock the socket in position.

It will be seen that the present invention provides a socket securing arrangement which avoids large through holes in the chassis material whereby there is provided a substantially unbroken chassis surface after the sockets are inserted.

In accordance with another aspect of the present invention, a simple means is provided for removing the socket body 10 from the chassis 12 in case this should ever be necessary. A tool, such as shown in Fig. 6 may be used. This tool consists essentially of a disc 50 having a number of cylindrical lugs 51 on one face. These lugs are so spaced as to engage the notches 24 of the socket body molding. The other face of disc 50 is provided with a T-handle 55 for rotating the tool, and with it the socket body. Rotation of the socket body 10 by means of this tool of Fig. 6 causes the deformed portions of the chassis material to be forced back out of notches 24 whereby the socket body may be removed from the chassis or mounting plate. A new socket may then be inserted and secured in place as described above.

While I have particularly shown and described several modifications of the present invention, it should be clearly understood that my invention is not limited thereto, but that further modifications may be made.

I claim:

1. A socket device including a body of insulating material in the form of a short flanged cylinder and having a number of contact clips secured therein, there being a number of longitudinal recesses in the outer surface of said body and passing through said flange, each of said recesses terminating in a flat step at a distance from the inner side of said flange equal to the thickness of a mounting plate into which said body is to be secured, and a mounting plate into which said body is to be secured, said plate having an aperture therein of a diameter adapted to pass the cylindrical part of said body, said plate being provided with a number of holes distributed about said aperture and closely adjacent thereto, said holes being adjacent said recesses, the material of said plate between said holes and said aperture being swaged into said recesses whereby said body is retained in said aperture.

2. A socket device including a body of insulating material in the form of a short flanged cylinder, there being a number of longitudinal grooves in the outer surface of said body and passing through said flange, each of said grooves

terminating in a flat step at a distance from the inner side of said flange equal to the thickness of a mounting plate into which said body is to be secured, and a mounting plate into which said body is to be secured, said plate having an aperture therein of a diameter adapted to pass the cylindrical part of said body, said plate being provided with a number of D-shaped holes distributed about said aperture and adjoining some of said grooves, the flat portion of the D being adjacent the groove, deformation of said D-shaped holes into round holes causing the material of said plate to be forced into said grooves whereby said body is maintained in position in said plate.

3. A socket device including a body of insulating material in the form of a short flanged cylinder and having a number of contact clips secured therein, there being a number of longitudinal grooves in the outer surface of said body and passing through said flange, each of said grooves terminating in a flat step at a distance from the inner side of said flange equal to the thickness of a mounting plate into which said body is to be secured, and a mounting plate into which said body is to be secured, said plate having an aperture therein of a diameter adapted to pass the cylindrical part of said body, said plate being provided with a number of narrow openings distributed about said aperture and adjoining some of said grooves, the length of said openings being normal to radial lines from said aperture, the material of said plate between said openings and said aperture being deformed into said grooves whereby said body is maintained in position in said plate.

4. A socket device including a body of insulating material in the form of a short flanged cylinder and having a number of contact clips secured therein, there being a number of longitudinal grooves in the outer surface of said body and passing through said flange, each of said grooves terminating in a flat step at a distance from the inner side of said flange equal to the thickness of a mounting plate into which said body is to be secured, and a mounting plate into which said body is to be secured, said plate having an aperture therein of a diameter adapted to pass the cylindrical part of said body, said plate being provided with a number of narrow openings distributed about said aperture and adjoining some of said grooves, the length of said openings being normal to radial lines from said aperture, the material of said plate between said openings and said aperture being deformed into said grooves whereby said body is maintained in position in said plate, said body being removable from said plate by rotating said body to force said plate material out of said grooves.

EDGAR K. NAUTH.

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