

May 9, 1939.

W. W. ROBINSON

2,157,188

PRONGED-DEVICE CONNECTOR

Filed Jan. 2, 1937

Fig. 1

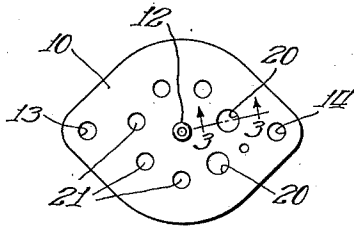


Fig. 4

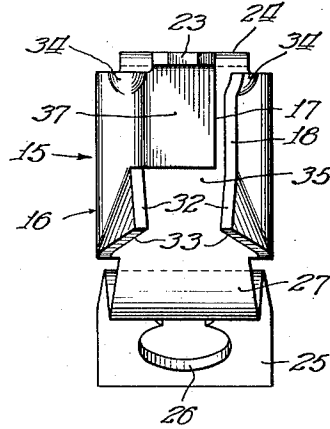


Fig. 2

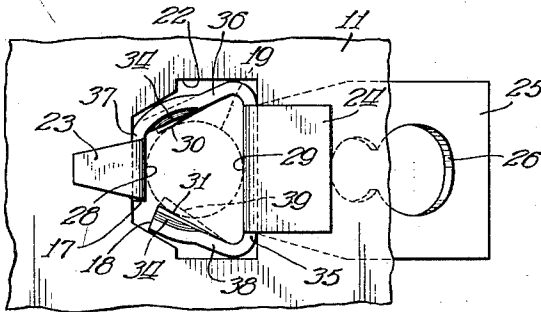


Fig. 5

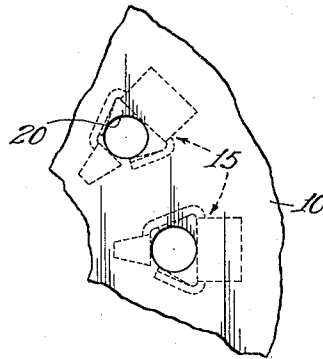
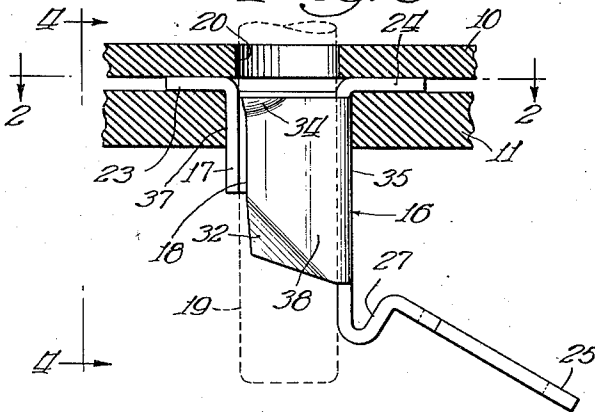


Fig. 3



Inventor:
Walter W. Robinson
By: A. Trevor Jones

Att.

UNITED STATES PATENT OFFICE

2,157,188

PRONGED-DEVICE CONNECTOR

Walter W. Robinson, Chicago, Ill.

Application January 2, 1937, Serial No. 118,717

1 Claim. (Cl. 173-328)

This invention relates to pronged-device connectors, more particularly for radio tubes, a connector of this type being frequently referred to as a socket, having individual sockets for a plurality of prongs or the like carried by the tube and generally arranged radially about the axis of the tube.

Among other objects, the invention aims to provide an improved connector of enhanced efficiency and simplicity of construction.

Other objects and advantages will be apparent from the following description, taken together with the accompanying drawing, in which:

Figure 1 is a plan view, in exemplary full size, of a connector or socket embodying my invention;

Figure 2 is an enlarged fragmentary plan view of one of the individual sockets as positioned on the device of Fig. 1 and being also a plan section taken on the line 2-2 of Fig. 3, with the top lamination of said device removed, a prong received in the socket being shown dotted;

Figure 3 is an enlarged fragmentary section taken on the line 3-3 of Fig. 1 and being an elevational view of the individual socket of Fig. 2;

Figure 4 is an enlarged separated view of an individual socket and being a view taken on the line 4-4 of Fig. 3 with mounting removed;

Figure 5 is a partial phantom plan view of the structure of Fig. 1, somewhat enlarged but on a smaller scale than Figs. 2, 3 and 4.

Referring in detail to the device illustrated in the drawing, there is shown an insulating laminated mounting comprising, in this instance, plates 10 and 11 which may be riveted together as at 12, centrally of the plates, and which may have registering holes 13 and 14 at each end respectively by which the device as a whole may be attached over an opening, generally circular, in a metallic chassis (not shown) of a radio receiving set, for example.

As is well known in the art, the connector members or individual sockets 15, one of which is shown enlarged and in separated relation in Fig. 4, are conveniently formed from initially flat slightly resilient sheet metal. In accordance with the present invention, the socket 15 comprises a body 16, having free ends 17 and 18 which are bent laterally of the body into socket form, and, in the present representation, into a four-sided socket of somewhat truncated triangular shape in cross-section, as best shown in Figs. 2 and 5, the purpose of this individual socket being to receive, with a frictional contact, the individual prong 19 indicated by the dotted lines in Figs. 2 and 3, it being understood that this prong is one of the

terminals of an electronic device, such as a radio vacuum tube or the like, and with which the individual socket of the present connector establishes an electrical connection. It will be further understood that a prong 19 will be received in each of the plug openings 20, of the insulating mounting member 10, and other similar prongs but preferably of slightly smaller diameter in the plug openings 21, each to make frictional contact with one of the individual sockets 15. The tube, as is well known, will thus be supported as a whole by the laminated mounting, the tube being of smaller diameter than the mounting so that it is insulated thereby from any metallic base, already alluded to, to which the mounting may be secured. In practice, the holes 20 may be slightly larger than the holes 21 to receive slightly larger prongs and thus locate the tube in a single predetermined rotative position with respect to the connector.

In order to support the individual sockets 15 on the mounting, the socket is passed through the irregular opening 22 in the lower insulating plate 11, this opening conforming somewhat in shape to the cross-section of the socket. Since the socket is desirably placed in the opening 22 somewhat against the resiliency of the free ends 17 and 18, it is thereby expanded outwardly in the opening, and is thus snugly held. Also the socket thus adapts itself to larger or smaller prongs for the holes 20 or 21, as the case may be. To further prevent displacement of the socket, it is desirably provided with lug portions 23 and 24 at its upper end which are bent right-angularly to the socket and as here shown, are received between the laminations 10 and 11, before the riveting or securing of these parts together. Thus each socket is aligned with one of the openings 20 or 21 in the upper insulating plate 10, the prong for a given socket being received therein with a slightly forced fit, so as to make a good electrical contact.

The electrical connection of the socket with a wire or other connector may be established through the tail-piece portion 25 of the socket, which in the present embodiment provides a soldering tongue depending somewhat obliquely from the lower end of the socket, that is, the end opposite the lugs 23 and 24. A perforation 26 in this tail-piece permits the insertion and soldering of the wire or the like, which is frequently done when the assembly is turned upside down. In this case, to prevent the solder from running into the socket, the tail-piece is advantageously joined to the socket by a return bend 27.

In accordance with the present invention, each

individual socket establishes a four-point contact with its respective prong in the sense that the prong is contacted at four places spaced apart about its circumference, but not all four points are in a single plane transverse to the axis of the prong and socket. This novel feature sets up compensating stresses in the metal of the socket under the influence of the prong and materially enhances the spring action and therefore the electrical conductivity of the socket. As here shown, two of these contact points are at 28 and 29, these being in one plane, and the other two contact points at 30 and 31, these being in another spaced-apart plane, that is, further down on the body of the socket. Of course, the contact at 29, being also a line contact is in both planes, that is, both in the plane of contact points 28—29 and in the plane of contact points 30—31. Thus in the last mentioned plane there are three contact points, i. e. 29—30—31, but desirably at no time are there four contact points in a given transverse plane since the contact 28, although somewhat of a line contact, terminates short of the transverse plane of contacts 30—31. The points 30 and 31 on the one hand, and the points 28 and 29 on the other hand, are also respectively in different axially extending intersecting planes, that is, in plan view, there is a contact point on each of the four walls of the socket. In this instance, the effectiveness of the contacts 30 and 31 is made possible or is enhanced by bending the lower corners 32 of the socket free ends 17 and 18 toward the longitudinal center line of the socket. This produces a relatively sharp edge 33 which is projected into the path of the prong and provides an improved, self-cleaning contact. In the transverse plane of the contact points 28 and 29, the side walls of the socket between these points are desirably slightly belled out as at 34, in order to facilitate entry of the prong into the socket and first into contact with the socket at 28—29 and then, but later, into still further contact at 30—31 as described, all with improved electrical conductivity.

Also in accordance with the present invention, it will be noted that the free end portions 17, 18 of the socket are asymmetrical, in that the free end portion 17, bent away from the back 35, provides both of the sides 36 and 37, whereas the free end portion 18 provides only the side 38. Also it will be noted that the lug 23 is carried solely by the free end portion 17, there being no lug portion, in this instance, on the free end 18. The other lug portion is carried by the socket back 35 and these lug portions are thus arranged to project in directions substantially diametrically opposed. There are no portions of the lugs projecting laterally of the socket toward another socket. The importance of this will be appreciated, when, by reference to Fig. 1, it will be seen that these parts must be placed very close together when there are as many even as seven or eight prong receiving members on a single mounting. Particularly in such event, it is extremely important to minimize the possibility of a short circuit from one socket to another. Con-

structed and arranged as here shown, it will be observed by particular reference to Fig. 5, that the sockets, in accordance with the present invention, may be located abreast, usually on the circumference of a common circle, the lugs of each socket disposed radially of this circle, with a minimum of danger of such short circuit occurring.

By reason of the fact that the socket wall 38 is supported at one end only, that is, where it joins the socket back 35, it will tend to have more spring action than the socket wall 36, which is supported both by the socket back 35 and by the front wall 37. Thus the socket wall 38, particularly in the vicinity of its inwardly directed lower corner 32, may be slightly further inwardly biased as shown in dotted lines at 39 in Fig. 2, to enhance its frictional engagement with the prong. This may also desirably produce a slight spiraling or torsional effect upon the socket as the prong moves thereinto, which contributes to the efficiency of the electrical connection, while at the same time permitting ease of insertion or withdrawal of the prong, by reason of what might be termed the enhanced "give" of the wall 38. Since the mounting is preferably formed of a laminated phenolic condensation product and the metal of the sockets is resilient, the entire structure avoids rigidity and there is some spring in the connector across the contact points 28—29 as well as the enhanced spring across the contact points 30—31.

Manifestly the invention is not limited to details of construction shown for purposes of illustration. Furthermore, it is not indispensable that all features of the invention be used conjointly, as various combinations and sub-combinations may be advantageously employed.

Having described my invention, I claim:

In a device of the class described embodying a resilient sheet metal initially flat body having its free ends bent laterally toward each other to form a four-sided socket of somewhat truncated triangular shape in cross-section and adapted to be carried by an insulating laminated mounting, the combination comprising the said structure in which one of the free ends is bent to form two sides of the socket and the other free end forms one side only thereof, holding lug portions at the upper end of said socket bent at right angles to the body, one on the body between the said free ends and the other on the free end which forms two sides of the socket, the said lugs being diametrically oppositely arranged and being adapted to be held between laminations of the mounting, and the lower corner of said free end which forms one side only of the socket being bent slightly inwardly to form an enhanced frictional contact with a prong or the like received in said socket whereby said socket is given a twisting motion when receiving said prong, the free end which forms one side only of the socket being free to be moved somewhat axially with the prong while the other side remains relatively immovable axially by reason of said holding lugs.

WALTER W. ROBINSON.