

Oct. 21, 1941.

S. M. DEL CAMP
ELECTRICAL CONNECTION
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2,259,740

Fig. 1.

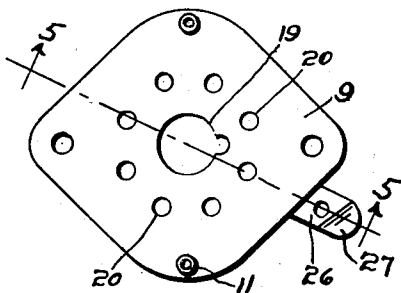


Fig. 2.

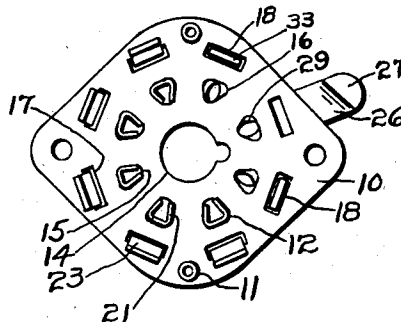


Fig. 3.

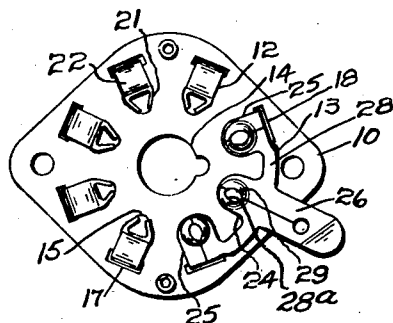


Fig. 4.

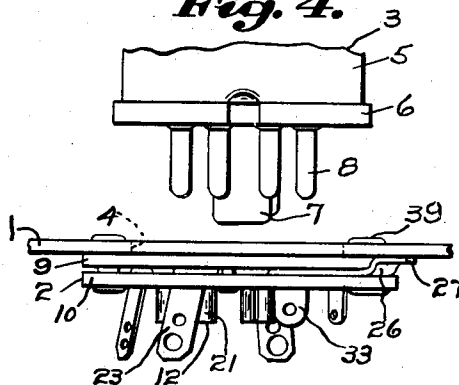


Fig. 5.

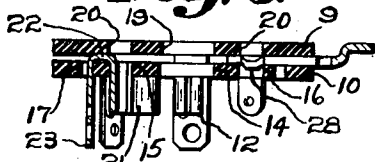


Fig. 6.

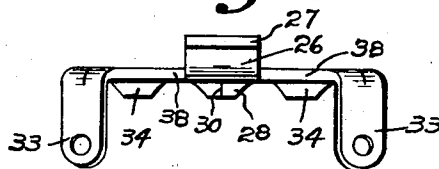
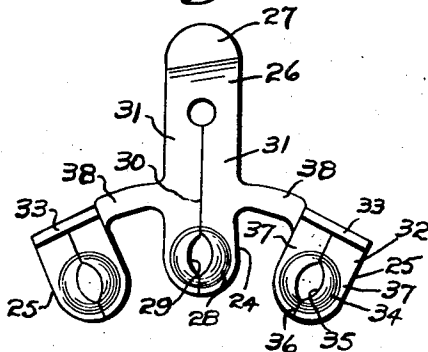


Fig. 7.



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UNITED STATES PATENT OFFICE

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ELECTRICAL CONNECTION

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2 Claims. (Cl. 173—328)

This invention relates to an improved socket member and more particularly to an improved contact for receiving the prong terminals of a vacuum tube, electrical plug or the like.

One object of my invention is the provision of a socket member for use in connection with an electrical plug having fixed prong terminals wherein the socket member has a one-piece multiple contact providing contact springs adapted to electrically connect at least two of the prong terminals and providing a common lead for the contact springs.

A further object of my invention is the provision of a socket member having a multiple contact constructed in a way to provide the shortest path connecting two or more prong terminals.

My invention is also directed to a one-piece multiple contact effecting a substantial saving in cost of labor and materials over individual contact springs heretofore used to effect the same objects thereof.

Other objects and uses of my invention will be apparent from inspection of the drawing and specification hereinbelow set forth.

Referring to the drawing, in which I have illustrated a preferred embodiment of my invention:

Fig. 1 is a top plan view of a socket member embodying my improved multiple contact;

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

Fig. 3 is a top plan view of the socket member after the upper insulating plate has been removed;

Fig. 4 is a side elevation of the socket member showing an electrical plug member in position for electrical connection with the socket member;

Fig. 5 is a sectional view taken along the line 5—5 of Fig. 1;

Fig. 6 is an end view of my improved multiple contact per se; and

Fig. 7 is a bottom plan view of the multiple contact shown in Fig. 6.

Referring to Fig. 4 of the drawing, I have shown a preferred installation including a supporting panel 1, a socket member 2 secured to the lower surface of the supporting panel 1 and a vacuum tube 3 in position to be moved into electrical connection with the socket member through the opening 4 of the panel 1. The vacuum tube 3, which is preferably of well known construction, has a metal envelope shield 5 and provides an insulating base 6. A guide member 7 of well known construction extends downwardly from the center of the base 6 and an annular

series of fixed prong terminals 8 form a ring around the guide member 7 and extend downwardly from the base 6 in substantially parallel relation to the guide member.

Referring in detail to the construction of my improved socket member, I have shown one having an insulating body comprising an upper insulating plate 9 and a lower insulating plate 10 secured in superposed relation as by the rivets 11 (Figs. 1 and 2). The socket member carries a plurality of individual contact springs 12 for electrical engagement with certain of the prong terminals 8 and a multiple contact 13 providing a plurality of contact springs for electrical engagement with those prong terminals 8 which it is desired to connect to a common lead. The lower insulating plate has a central opening 14 conforming to the cross-sectional shape of the guide member 7 of the vacuum tube and adapted to receive the guide member to position the contact springs of the socket member in registry with proper prong terminals. The lower plate 10 has a series of openings 15 arranged in an arc around the opening 14 to receive prong-engaging portions of the contacts 12 and a number of openings 16, herein shown as three, to receive the contact springs of the multiple contact 13. The arc of the openings 15 and the arc of the openings 16 combine to form an annular series of openings arranged to enable the prong-engaging portions of the contact springs in alignment therewith to register with the annular series of prong terminals 8. The lower plate 10 has a series of rectangular openings 17 arranged in an arc outside the arc of the openings 15 to receive respective soldering terminals of the contacts 12 and a plurality of openings 18 arranged in an arc outside the openings 16 to receive positioning lugs of the multiple contact 13, as will be described. The upper plate 9 has a central opening 19 in alignment with the opening 14 of the lower plate 10 and an annular series of prong-receiving openings 20 in alignment with the annular series of openings 15 and 16 of the lower plate. Each of the contact members 12, in my preferred form, comprises yieldable, tubular-like prong-engaging portions 21 in alignment with the openings 15 and extending through the same. A saddle portion 22 is integrally joined to the prong-engaging portion 21 adjacent one end thereof and normally disposed between the insulating plates 9 and 10 and a soldering terminal 23 extends from the saddle 22 through an opening 17 of the lower plate 10.

Referring in detail to the multiple contact 13,

as most clearly illustrated in Figs. 6 and 7, I have shown one formed of one-piece resilient metal. The multiple contact in my preferred form provides three contact springs including an intermediate spring 24 and side springs 25—25 disposed laterally on opposite sides of the spring 24. The spring 24 is in the form of an elongated strip having a lead terminal 26 at one end. The lead terminal 26 is adapted to extend beyond the marginal edge of the socket member when the parts are in final assembly and provides a raised soldering portion 27 at its outermost end adapted to be soldered or otherwise secured in electrical engagement to the lower surface of the supporting panel 1, as most clearly shown in Fig. 4. The contact spring 24 has an extruded portion 28 adjacent its opposite end from the terminal lead 26 defining a prong-receiving opening 29. The spring 24 has a slit 30 extending from its end away from the terminal lead 26 longitudinally of the strip for a predetermined distance and bisecting the prong-receiving opening 29 so as to form yieldable arms 31—31. Thus the arms 31—31 are disposed in adjacent coplanar relation and adapted to yield laterally on entrance of a prong terminal 8 through the prong-receiving opening 29 and cause the narrow edges 28^a (Fig. 3) of the opposed halves of the extruded portion 28 to resiliently bite the prong terminals effecting an excellent electrical contact. In view of the fact that the extruded portion 28 is struck downwardly from the strip in the relative position of the part shown in Fig. 5, the extruded portion effects a projection adapted to seat itself within an opening 16 of the lower plate 10 and at the same time the extruded portion provides a lead for guiding the prong terminal through the opening 29. Each of the laterally disposed contact springs 25 comprises a flat portion 32 preferably in the plane of the arms 31—31 of the spring 26 and an angularly projecting portion 33 at one end of the flat portion 32 bent downwardly relative to the plane of the flat portion. Each of the springs 25—25 has an extruded portion 34 at an end thereof away from the projecting portion 33 defining prong-receiving openings 35 (Fig. 7). Each of the flat portions 32 has a slit 36 extending from adjacent the end having the extruded portion, preferably through the respective flat portions, and bisecting the respective prong-receiving openings 35 to form yieldable adjacent arms 37—37 which cooperate to cause the extruded portions 34 to electrically engage prong terminals 8 in the manner of the arms 31—31 of the spring 26. Connecting portions 38 integrally join the contact springs 25—25 to the intermediate spring 24 with the result that the three springs have one common lead through the terminal 26 thus eliminating the possibility of increased resistance, and, at the same time, the multiple contact effects the shortest path for connecting three of the prong terminals 8.

In final assembly of the parts of the socket, the individual contacts 12 are assembled with the insulating plates 9 and 10 with the prong-engaging portions 21 disposed within the openings 15 of the lower plate 10 and the soldering terminals 23 extending through the openings 17. When the contact terminals 12 are in this position, the saddle portions 22 are disposed between the insulating plates 9 and 10 and prevent relative axial movement of the prong-engaging portions 21. The multiple contact 13 is assembled with the insulating plates 9 and 10 so as to dispose the extruded portions of the contact springs

24 and 25 within the openings 16 of the lower plate 10 with the angular projections 33 extending through a pair of openings 18 of the lower plate 10 to maintain the multiple contact in proper position. The socket member is secured to the supporting panel 1 through any suitable means, such as the rivets 39 (Fig. 4), and finally the terminal lead 26 is soldered to the supporting panel 1.

As a result of my improved socket member, wherein I have employed a one-piece triple contact, the filament or heater line, the cathode lead, and, in the case of a metal tube, the envelope lead may be connected together and grounded to the chassis through the multiple contact. As these three leads are next to one another in metal tubes now in commercial use, my multiple contact effects an efficient method of grounding the leads, at the same time saving a considerable amount of labor and solder over the methods previously used wherein each of the leads was grounded to the chassis of the radio through an individual contact for each prong terminal.

Although I have illustrated and described a preferred embodiment of my invention, I do not wish to be limited thereby because the scope of my invention is best defined by the following claims.

I claim:

1. An electrical socket member adapted to cooperate with a plug device carrying a series of terminal prongs, said socket member comprising upper and lower insulating plates having a single group of annularly arranged apertures, said socket member carrying a plurality of single contact springs, each of said springs having a prong-engaging portion in alignment with an aperture of said lower plate and a portion for electrical connection to said spring, and a one-piece multiple contact carried by said plates having a plurality of contact springs in alignment with other of said apertures of said lower plate, said last-mentioned springs lying in a generally flat plane disposed between said insulating plates, and a positioning means integral with said multiple contact in inter-engagement with one of said plates to maintain the contact springs thereof in alignment with said respective openings.

2. An electrical socket member adapted to cooperate with a plug device carrying a series of terminal prongs, said socket member comprising upper and lower insulating plates having a single group of annularly arranged apertures, said socket member carrying a plurality of single contact springs, each of said springs having a prong-engaging portion in alignment with an aperture of said lower plate and a portion for electrical connection to said spring, and a one-piece multiple contact carried by said plates having a plurality of contact springs in alignment with other of said apertures of said lower plate, said last-mentioned springs lying in a generally flat plane disposed between said insulating plates, a positioning means integral with said multiple contact in inter-engagement with one of said plates to maintain the contact springs thereof in alignment with said respective openings, a single terminal lead integrally joined to said multiple contact at substantially the center thereof whereby said contact springs thereof have a common lead, and at least a portion of said terminal lead lying in the generally flat plane of said contact springs of said multiple contact.

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