

Aug. 21, 1956

S. M. DEL CAMP

2,760,176

ELECTRICAL SOCKET AND CONTACTS THEREFOR

Filed Dec. 15, 1950

2 Sheets-Sheet 1

FIG. 1.

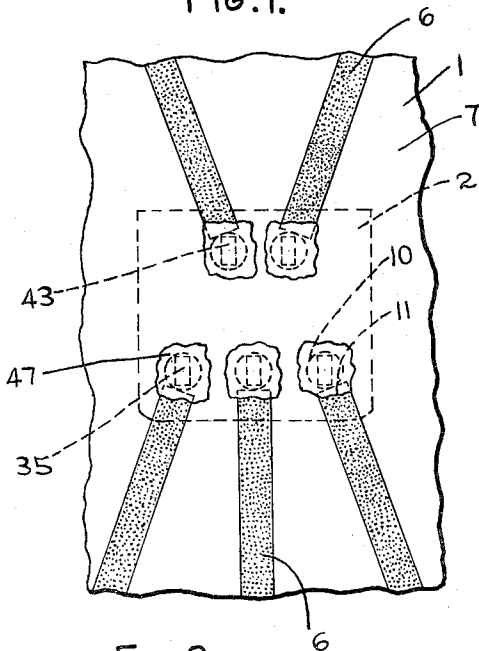


FIG. 2.

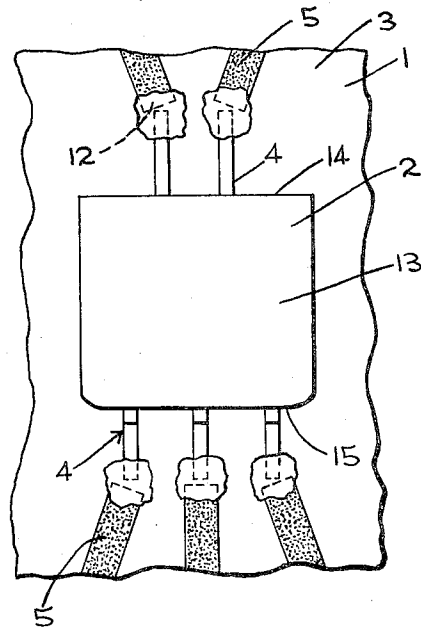


FIG. 3.

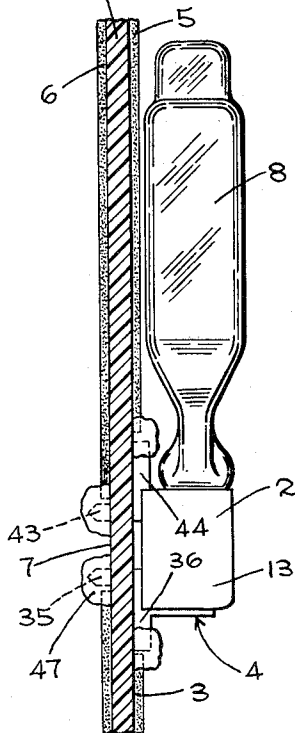


FIG. 5.

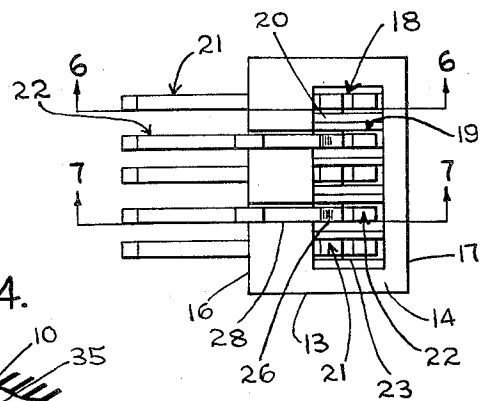
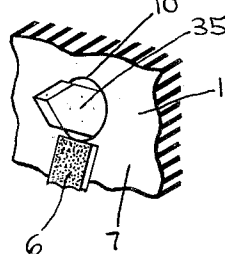


FIG. 4.



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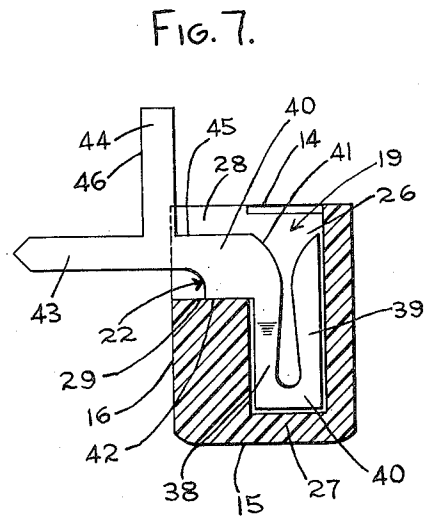
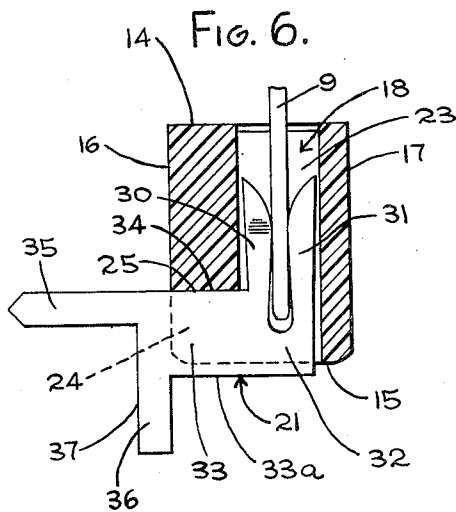
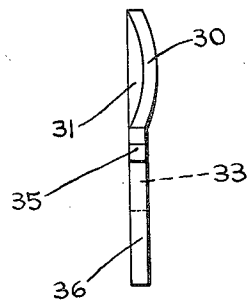
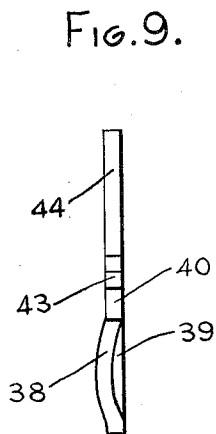


FIG. 8.



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2,760,176

ELECTRICAL SOCKET AND CONTACTS THEREFOR

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Application December 15, 1950, Serial No. 200,963

3 Claims. (Cl. 339—192)

The present invention relates to sockets for vacuum tubes, connector plugs and the like and more particularly to sockets of the so-called subminiature type adapted for holding extremely small tubes. This application is directed to an improved socket device over those shown in my co-pending applications, Serial Nos. 47,365 and 194,681. Serial No. 47,365 is now Patent No. 2,613,244.

One object of my invention is to provide a socket of the above type adapted for use in electrical devices where the circuit conducting elements are printed or painted on an insulating panel.

Another object of my invention is the provision of a socket unit constructed in a way to enable the contact members to be easily connected to the circuit conducting elements and at the same time effect an efficient attachment of the socket to the insulating panel carrying the conducting elements.

A further object of my invention is the provision of a socket carrying contact members which provide elements for electrical connection to conducting elements disposed on opposed surfaces of a supporting panel and which, at the same time, operate to space the socket unit from the supporting panel.

Still another object of my invention is to provide an improved contact member constructed in a way to effect initial assembly with the socket body and provide means for soldered electrical engagement with conducting elements carried by a supporting part.

Other objects and uses of my invention will be apparent from inspection of the drawings and specification herein below set forth.

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

Fig. 1 shows the rear surface of a supporting panel with the terminal portions of the contact members of a socket secured to the panel in electrical engagement with printed circuit conductor elements carried by said rear surface;

Fig. 2 is a front view of the supporting panel showing the socket unit carrying contact members which are electrically engaged with printed circuit conductor elements carried by the front surface of the panel;

Fig. 3 is a side elevation of the socket installation shown in Figs. 1 and 2 with a vacuum tube mounted in the socket unit;

Fig. 4 is a perspective view of a portion of the supporting panel with a terminal element of a contact member of the socket projecting through the panel adjacent an end of a conductor element of the printed circuit;

Fig. 5 is a top plan view of the socket unit of the invention;

Fig. 6 is an enlarged section taken along the line 6—6 of Fig. 5;

Fig. 7 is an enlarged section taken along the line 7—7 of Fig. 5;

Fig. 8 is a side elevation of one form of improved contact member looking from the left of Fig. 6; and

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Fig. 9 is a side elevation of a second form of contact member looking from the left of Fig. 7.

Referring to the drawings, Figs. 1-3 illustrate a preferred embodiment of the socket installation comprising a supporting panel 1 of insulating material, a socket unit 2 secured to the supporting panel adjacent a side 3 thereof and carrying contact members 4. The contact members 4 are electrically engaged with both the conducting elements 5 of a printed circuit carried by the front surface 3 of the panel and the conducting elements 6 of a printed circuit carried by the opposite or rear surface 7 of the panel. A vacuum tube 8 is mounted in the socket unit 2 and provides prongs 9 (Fig. 6) electrically engaged with the contact members of the socket unit.

The supporting panel 1 is formed of a relatively thin sheet of insulating material having apertures 10 (Figs. 1 and 4) for receiving terminal elements of the contact members carried by the socket unit. The apertures 10 are disposed in upper and lower rows with the apertures of one row positioned in staggered relation to the apertures of the other row. The conductor elements 6 on the rear surface of the panel 1 have ends 11 which terminate adjacent the apertures 10 and the conductor elements 5 of the front surface 3 of the panel have ends 12 which terminate in spaced relation to top and bottom end surfaces of the socket unit for a purpose to be described.

Referring in detail to the specific construction of the socket unit 2, the socket body 13 is formed of insulating material and is preferably rectangular in shape having an upper end face 14, a lower end face 15 and side faces 16 and 17 between the end faces. A row of prong-receiving openings 18 and 19 are formed in the socket body which are preferably disposed in a straight line, alternating relation with each opening separated from an adjacent opening by a thin partition element 20 of the socket body. The prong-receiving opening 18 is constructed to receive one type of contact member 21 which is illustrated in Figs. 6 and 8 and the prong-receiving opening 19 is constructed to receive the type of contact member 22 which is illustrated in Figs. 7 and 9. The contact-receiving opening 18 (Fig. 6) comprises a generally rectangular bore portion 23 extending from the upper end surface 14 of the socket body 13 to the lower end surface 15 in parallel relation to the side face 16 of the socket body. A slot 24 is formed in the end face 15 which extends from the bore 23 in the plane thereof to the side face 16. An abutment 25 of the body 13 closes the slot 24 adjacent the side face 16. Each of the openings 19 comprises a rectangular bore portion 26 which extends from the upper end face 14 of the body 13 toward the lower end face 15 in substantially parallel relation to the side face 16. The bore 26 is closed as at 27 adjacent the end face 15. A slot 28 is formed in the end face 14 which extends from the bore 26 to the side face 16. The lower end of the slot 28 is closed by an abutment 29 of the socket body adjacent the side face 16.

The form of contact member 21 provides a prong-engaging portion of U-shape comprising leg elements 30 and 31 joined at an end 32 of the prong-engaging portion. One of the legs, which I have shown as the leg 30 in the preferred form, is bowed laterally of its normal plane a distance slightly greater than the narrow width of the rectangular bore 23 so as to engage resiliently the long walls of the bore 23 when the contact member is in assembly with the socket body and hold the contact in initial attachment to the body. A terminal portion 33 is integrally joined to the prong-engaging portion adjacent the end 32 and extends from the prong-engaging portion in a direction substantially perpendicular to the leg elements 30 and 31. The terminal portion 33 has an

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upper edge 34 adapted to engage the abutment 25 when the contact member is in assembly with the socket body. The outer-most end of the terminal portion 33 has a pair of lead-engaging elements 35 and 36 which are of flat construction and disposed in the plane of the terminal portion 33. The lead-engaging element 35 is of narrow finger-shape construction so as to enter an aperture 10 of the supporting panel and extends in a direction substantially perpendicular to that of the prong-engaging legs 30 and 31. The lead-engaging element 36 is integrally joined to the terminal portion 33 at a point spaced from the outermost end of the element 35 and provides a narrow finger-shaped portion disposed at an angle of 90° relative to the element 35 and projecting beyond the lower edge 33a of the terminal portion 33.

The form of contact member 22, as shown in Fig. 7, provides a prong-engaging portion of generally U-shape comprising a pair of resilient legs 38 and 39 joined at the end 40 of the prong-engaging portion. One of the legs, which I have chosen to illustrate as leg 38, is bowed laterally outwardly in the manner of the leg 30 of the first form of contact member for resilient engagement with the walls surrounding the bore 26 to hold the contact member in initial attachment to the socket body. A terminal portion 40 is integrally joined to the leg 38 adjacent its outer end 41 and extends from the prong-engaging portion in a direction substantially perpendicular to that of the legs 38 and 39. The terminal portion 40 has a lower edge 42 for engagement with the abutment 29 of the body 13 when the contact member is in assembly with the socket body as illustrated in Fig. 7. The terminal portion 40 provides at its outer-most end a pair of lead-engaging elements 43 and 44. The lead-engaging elements 43 and 44 are of flat construction and disposed in the plane of the terminal portion 40. The element 43 is of narrow, finger-like construction so as to enter an aperture 10 of the supporting panel and projects from the terminal portion in a direction substantially perpendicular to that of the prong-engaging legs 38 and 39. The element 44 which is also of narrow finger-like construction is integrally joined to the upper edge 45 of the terminal portion at a point spaced from the outer end of the element 43 and extends from the terminal portion in right angular relation to the element 43.

In assembling the contact member 21 with the socket body, the open ends of the legs 30 and 31 are moved into the bore 23 through the end face 15 of the body. When the contact member is in final position the open ends of the legs 30 and 31 will be positioned to receive a terminal prong 9 inserted into the socket body through the end face 14 thereof, and the terminal portion 33 will be seated in the slot 24 with the edge 34 in abutting engagement with the abutment 25. After assembly, the lead-engaging element 35 will be positioned exteriorly of the side face 16 and will project in a direction substantially perpendicular to the bore 23. At the same time, the lead-engaging element 36 will project beyond the end face 15 of the socket body and its side edge 37 will be disposed laterally exteriorly of the side face 16 of the body.

In assembling the contact member 22 with the socket body, the prong-engaging portion is moved into the bore 26 through the end face 14 of the body so that in final position the end portion 40 of the prong-engaging portion is positioned adjacent the closed end 27 of the bore and the open end of the prong-engaging portion is disposed adjacent the end face 14 of the body so as to receive a prong terminal inserted into the bore 26 through the end face 14. When the contact member 22 is properly assembled with the socket body, the lead-engaging element 43 will extend laterally of the side face 16 exteriorly of the body in a direction substantially perpendicular to that of the bore 26. At the same time, the lead-engaging element 44 will project upwardly beyond the end face 14 of the socket body in a direction substantially parallel to the bore 26 and its side edge 46 will be dis-

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posed laterally of the side face 16 exteriorly of the socket body.

It will be noted that when the two forms of contact members are assembled with the socket body, the lead-engaging elements 35 and 43 are disposed in staggered, laterally offset relation. Thus, the elements 35 are positioned, with respect to the socket body, nearer to the end face 15 of the body than the elements 43 and the planes of the elements 43 are disposed intermediate the planes of the elements 35. At the same time, the lead-engaging elements 36 of the contact members 21 project downwardly below the end face 15 of the socket body while the lead-engaging elements 46 of the contact member 22 project upwardly beyond the end face 14 of the socket body.

The socket unit is assembled with the supporting panel 1 by moving the lead-engaging elements 35 and 43 through the apertures 10 of the panel so that the elements 43 project through the upper row of apertures (viewing Fig. 1) and the elements 35 project through the lower row of apertures. With the parts in this relative position, the outer ends of the elements 35 and 43 will be disposed adjacent the ends 11 of the conductor elements 6. At the same time, the edges 37 and 46 of the respective elements 36 and 44 will abut the front surface 3 of the panel and the outer ends of the elements 36 and 44 will be disposed adjacent the ends 12 of the conducting elements 5 of the printed circuit carried by the front face of the panel. Final attachment of the socket unit to the supporting panel is effected by soldering, as at 47, the outer ends of the elements 35 and 43 to their respective conductor elements 6 and the outer ends of the elements 36 and 44 to their respective conductor elements 5. By this soldering action, the contact members are secured in electrical engagement with the conductor elements and, at the same time, the operation by which the lead-engaging elements are soldered to the conductor elements effects a secure attachment of the socket unit to the supporting panel. I will be noted that when the socket unit is in final attached position the side edges 37 and 46 of the lead-engaging elements 36 and 44 engage the surface 3 of the supporting panel to space the socket unit a slight distance from the surface 3. As a result, the socket unit is disposed laterally of the supporting panel a sufficient distance to enable the vacuum tube to be easily mounted in the socket.

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

I claim:

1. An electrical socket comprising a socket body having upper and lower end faces and a side face between said end faces, said body having a plurality of prong-receiving bores extending from said upper of said end faces toward the other of said end faces in substantially parallel relation, said bores being of two types, the first type of bore being constructed to receive contact members inserted into the same from the upper end face of said body, the second type of bore being constructed to receive contact members inserted into the same from the lower end face of said body, contact members assembled with said body having prong-engaging portions disposed in said bores, said contact members disposed in said first type of bores having a connection portion providing a pair of lead-engaging elements, one of said elements extending beyond said side face in a direction substantially perpendicular to said bores and said other element extending beyond said upper end face in a direction substantially parallel to said bores, said other element being spaced inwardly from the terminal of said first element and lying in a plane immediately adjacent to said side face, and said contact members disposed in said second type of bores providing a pair of lead-engaging elements, one of said last-mentioned elements extending beyond said side face in a direction substantially

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perpendicular to said bores and said other element extending beyond said lower end face in a direction substantially parallel to said bores, said other element being spaced inwardly from the terminal of said first element and lying in a plane immediately adjacent to said side face. 5

2. An electrical socket comprising an insulating body having prong receiving bores extending into said body from one end in substantially parallel relation to a side face thereof, said body having a slot in said end extending from said bore to said side face, and a flat one-piece metal contact member having a resilient prong-engaging portion disposed entirely in the bore, said prong-engaging portion being generally U-shaped in configuration and having leg portions joined at the end of said prong-engaging portions most remote from said end of said socket body, said contact member having a terminal portion joined to one only of said legs adjacent a free end of said leg, said terminal portion being disposed in said slot, and said terminal portion having a pair of finger-like, soldering tail elements extending at substantially right angles to one another, one of said elements extending beyond said side face in a direction substantially perpendicular to said legs and the other of said elements extending beyond said end in a direction substantially parallel to said legs so as to contact a panel face when the first said elements are mounted to engage the other panel face. 10 15 20 25

3. An electrical socket comprising a socket body having a plurality of contact receiving bores opening on one face, alternate bores continuing through an opposite face of said bore, a flat one-piece contact member positioned in

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each bore, said contact members having soldering means on a side wall with alternate contacts having soldering means spaced adjacent the opposite ends of said side wall, said soldering means including a first tab normal to the side wall and a second tab parallel to the side wall and extending beyond the socket whereby printed circuits on either side of a panel to which the socket is to be positioned may be connected to each contact of said circuit with the socket being spaced from the panel, and the staggered soldering means on opposite sides of the socket preventing its removal from a panel.

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