

Sept. 24, 1957

S. M. DEL CAMP

2,807,790

ELECTRICAL SOCKET AND CONTACTS THEREFOR

Original Filed Nov. 8, 1950

2 Sheets-Sheet 1

FIG. 1.

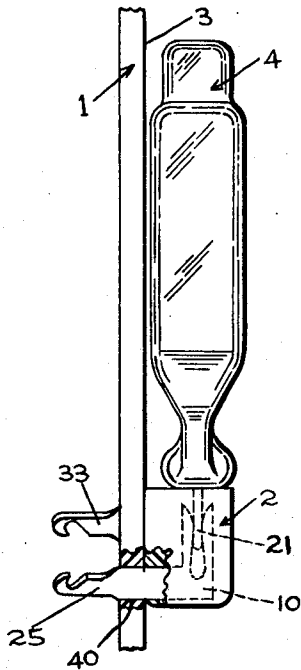


FIG. 2.

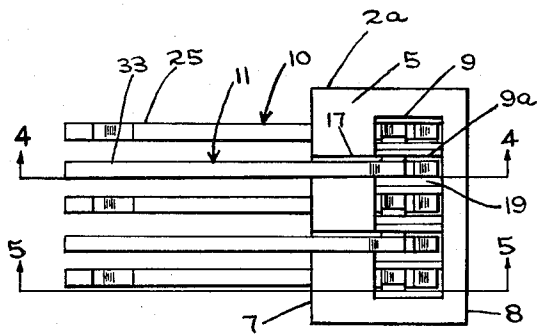


FIG. 3.

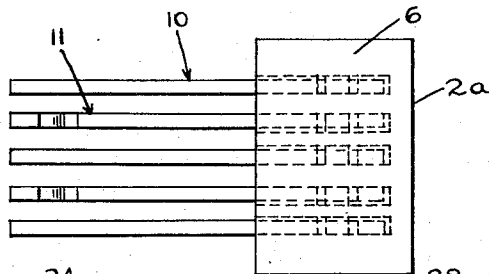


FIG. 4.

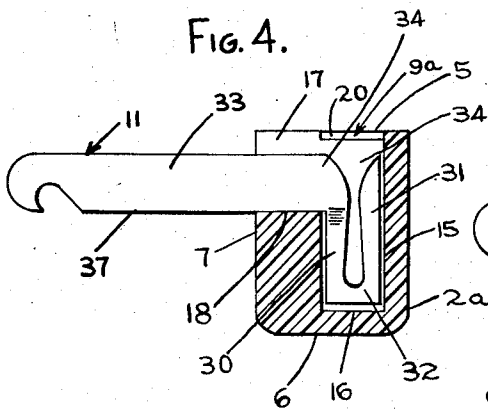
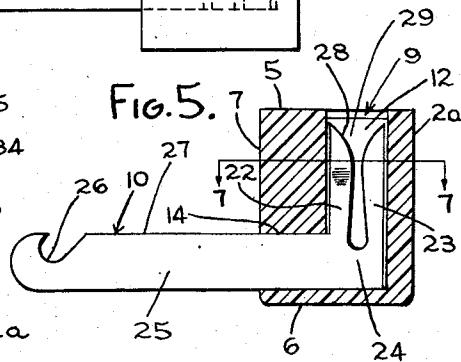


FIG. 5.



INVENTOR
SCIPIONE M. DEL CAMP,
By John Todd
ATTORNEY

Sept. 24, 1957

S. M. DEL CAMP

2,807,790

ELECTRICAL SOCKET AND CONTACTS THEREFOR

Original Filed Nov. 8, 1950

2 Sheets-Sheet 2

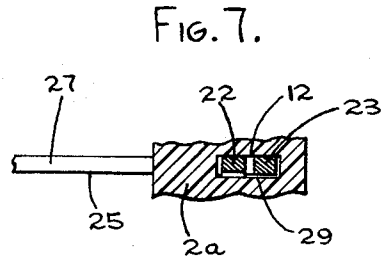
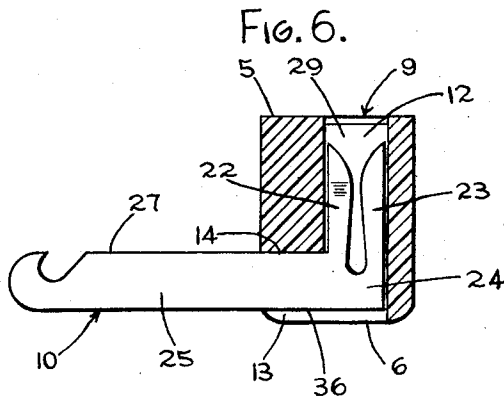


FIG. 8.

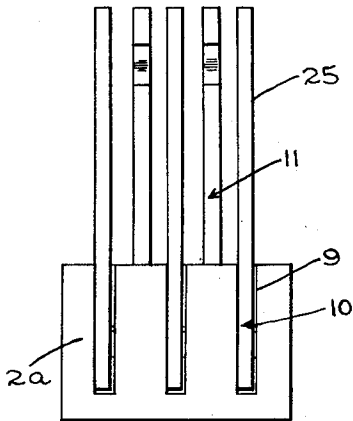


FIG. 9.

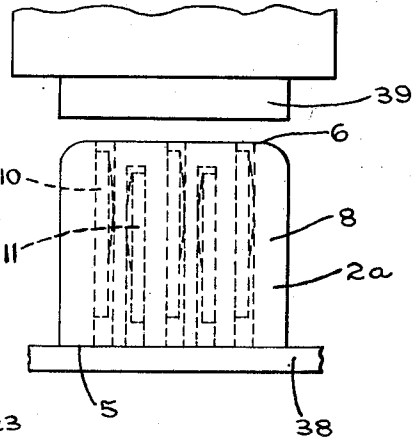


FIG. 10.

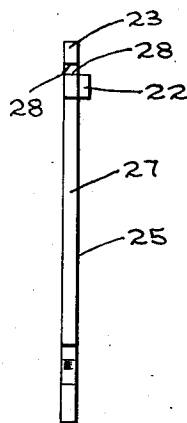
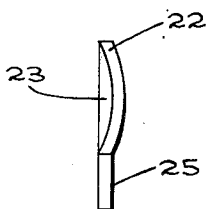


FIG. 11.



INVENTOR
SCIPIONE M. DEL CAMP,
By *John J. Judd*
ATTORNEY

1

2,807,790

ELECTRICAL SOCKET AND CONTACTS THEREFOR

Scipione M. Del Camp, Maywood, Ill., assignor to Cinch Manufacturing Corporation, Chicago, Ill., a corporation of Illinois

Original application November 8, 1950, Serial No. 194,681, now Patent No. 2,759,223, dated August 21, 1956. Divided and this application July 20, 1954, Serial No. 444,602

2 Claims. (Cl. 339—220)

The present invention relates to sockets for vacuum tubes, connector plugs and the like and more particularly to sockets adapted for holding extremely small vacuum tubes. Reference is made to Patent No. 2,759,223 of which this patent is a divisional. The use of very small vacuum tubes is becoming more and more common in connection with small electronic devices such as the vest pocket hearing aid apparatus and various electronically controlled weapons used by the military services. The vacuum tube used in these miniature devices is commonly made with 5 prong terminals projecting from the lower end of the tube and disposed in a straight line. One problem in connection with the development of satisfactory sockets for these tubes relates to the necessity of having the prong-engaging portions of the contact members of the socket disposed in line to receive the line of prong-terminals, but, at the same time, it is necessary because of the very small size of the contact members to stagger the terminal elements of the contact members to which lead wires are soldered so that sufficient space is provided between the terminals to permit an efficient soldering operation without cross-circuiting dangers.

One object of my invention is a provision of a socket having contact members of novel design assembled therewith in a way to effect a staggered disposition of the terminal elements of the contact members.

Another object of my invention relates to the method of assembling contact members with the socket body permitting the contact members to be assembled in initial engagement with the body and thereafter sealing the openings of the body in which the contact members are disposed preventing movement of certain portions of the contact members with respect to the body when prong terminals of a tube member are engaged therewith.

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

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

Fig. 1 is a side elevation of a socket installation including a supporting panel, a socket secured to the panel and a vacuum tube in engagement with the socket;

Fig. 2 is an enlarged top view of the socket illustrated in Fig. 1;

Fig. 3 is a bottom view of the socket shown in Fig. 2;

Fig. 4 is a section taken along the line 4—4 of Fig. 2;

Fig. 5 is a section taken along the line 5—5 of Fig. 2;

Fig. 6 is a section similar to Fig. 5 showing the contact member in initial assembly with the socket body prior to sealing the opening of the socket body to maintain the contact member in final assembly therewith;

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

Fig. 8 is a bottom view of the socket prior to the operation in which the openings receiving certain contact members are sealed;

Fig. 9 is a view showing a method by which heat is

2

applied to the socket body to seal certain of the contact-receiving openings;

Fig. 10 is a top elevation of the type of contact member illustrated in Figs. 5 and 6; and

Fig. 11 is an end elevation of the same contact member looking from the left of Fig. 6.

Referring to the drawings, Fig. 1 illustrates a preferred embodiment of the socket installation comprising a panel 1 of insulating material, a socket unit 2 secured to the panel adjacent a side 3 thereof and a vacuum tube 4 electrically engaged with the socket unit 2.

Referring in detail to the specific construction of the socket unit 2, the socket body 2a is formed of insulating material and is preferably rectangular in shape having an upper end surface 5, a lower end surface 6 and side surfaces 7 and 8 between the end surfaces. Prong-receiving openings 9 and 9a are formed in the socket body 5 and are preferably disposed in alternating relation. The contact-receiving opening 9 is constructed to receive one type of contact member 10 which is illustrated in Figs. 5, 10 and 11 and the contact-receiving opening 9a is constructed to receive the type of contact member 11 which is illustrated in Fig. 4. The contact-receiving opening 9 in initial form of the socket unit comprises a generally rectangular bore portion 12 which extends from the upper end surface 5 of the socket body in substantially parallel relation to the side face 7 to the lower end face 6. A slot 13 (Fig. 6) is formed in the end face 6 which extends from the bore 12 in the plane thereof to the side wall 7. An abutment 14 of the socket body closes the slot 13 adjacent the wall 7 and is preferably spaced from the end surface 6 a distance greater than the width of the terminal portion of the contact member 10 for a purpose to be described. Each of the openings 9a comprises a generally rectangular bore portion 15 which extends from the end surface 5 into said body in substantially parallel relation to the side faces 7 and 8. The bore 15 is closed at its inner end by a portion of the body 16. A slot 17 is formed in the end surface 5 of the body and extends from the bore 15 in the plane thereof to the side wall 7. The lower end of the slot 17 is closed by an abutment portion 18 of the socket body. It will be noticed that in my preferred form the socket body provides three openings 9 and two openings 9a arranged in alternating linear relation, the openings being separated one from another by the thin partition portions 19. The partition portions 19 may be beveled slightly as at 20 adjacent the end surface 5 to effect a lead for the prong terminals 21 (Fig. 1) of the tube 4.

The type of contact member characterized by the numeral 10 provides a prong-engaging portion of U-shape comprising leg elements 22 and 23 joined at an end 24 of the prong-engaging portion. A terminal element 25 is integrally joined to the prong-engaging portion adjacent the end portion 24 and extends from the prong-engaging portion in substantially perpendicular relation thereto. The terminal 25 may have a slot 26 in its upper narrow edge 27 for facilitating soldering of a wire (not shown) thereto. The legs 22 and 23 are disposed with their inner narrow edges 28 in opposite facing relation and spaced apart a predetermined distance to receive and resiliently engage a prong-terminal 21. One of the legs, which I have shown as the leg 22 in my preferred form, is bowed laterally of its normal plane a distance slightly greater than the narrow width of the rectangular bore 12 so as to engage resiliently the long walls 29 of the bore 12 when the contact member is in assembly with the socket body.

The contact member 11 provides a prong-engaging portion of generally U-shape comprising a pair of resilient

3

legs 30 and 31 joined at the end 32 of the prong-engaging portion. A terminal portion 33 is integrally joined to the leg 30 adjacent its end 34 away from the end 32 of the prong-engaging portion. The terminal portion 33 extends from the prong-engaging portion in a direction substantially perpendicular thereto. One of the legs, which I have chosen to illustrate as leg 30, is bowed laterally outwardly a distance greater than the width of the bore 15 so as to engage resiliently the long walls 34 adjacent the bore when the contact member is in assembly with the socket body. Thus, it will be seen that the legs 22 and 30 of the respective contact members 10 and 11 are bowed outwardly in substantially the same manner and for the same purpose, but in my preferred socket unit, for spacing purposes, I have chosen to bow the leg 22 in an opposite direction to that taken by the bow of the leg 30.

In assembling the contact member 10 with the socket body the open ends of the legs 22 and 23 are moved into the bore 12' from the lower surface 6 of the body. When the contact member is in final position the open end of the prong-engaging portion will be disposed adjacent the end surface 5 and the terminal portion 12 will be seated in the slot 13 with the edge 27 in abutting engagement with the abutment 14. Thus, a substantial part of the terminal portion 25 will extend laterally beyond the side face 7 of the socket body as illustrated in Fig. 6. At the same time, the portion 36 of the lower edge of the terminal portion 25 (Fig. 6) will be countersunk within the socket body to facilitate sealing of the opening 9 adjacent the end surface 6 in a manner to be described.

In assembling the contact member 11 with the socket body the prong-engaging portion is moved into the bore 15 from the upper surface 5 of the body so that in final position the joined ends 32 of the legs 30 and 31 are positioned adjacent the closed end 16 of the bore and the open end of the prong-engaging portion is disposed adjacent the end surface 5. At the same time, the terminal portion 33 will be disposed within the slot 17 with its lower edge 37 in abutting engagement with the abutment 18 of the socket body. When the contact member 11 is correctly positioned, a substantial part of the terminal portion 33 extends laterally beyond the end side surface 7 for a distance preferably equal to that of the laterally extending part of the terminal portion 25 of the contact member 10. As a result of the bowed construction of the leg 30, the contact members 11 will be held in firm resilient engagement with the walls of the socket body adjacent the opening 9a.

It will be noted that the contact members, as now assembled with the socket body, provide terminal portions in staggered laterally offset relation. Thus, the terminal portions 33 are disposed, with respect to the socket body, nearer to the upper end surface 5 of the body than the terminal portions 25 of the contact members 10 and the planes of the portions 33 are positioned intermediate the planes of the terminal portions 25. As a result, adequate space is provided between the terminal portions of the two types of contact members to permit the soldering of wires thereto without danger of cross-circuiting the leads.

The final step in assembling the contact members with the socket body is illustrated in Fig. 9. In this operation the socket body is placed upon a supporting plate 38 with its end surface 5 resting upon the plate. In this position the end surface 6 of the socket body is exposed to an iron 39 which is heated to a degree greater than the softening point of the plastic material of which the socket body is formed. As the iron contacts the end surface 6,

4

the material of the end surface adjacent the openings 9 will flow so as to seal the openings 9 adjacent the end surface 6 as shown in Fig. 5. Applicant's preferred material for manufacture of the socket body is preferably phenolic resin which softens at about 300° Fahrenheit. This material, even though thermosetting flows readily upon application of the hot iron 39 heated to the proper temperature and a positive sealing of the openings 9 is effected. As a result of this sealing, the contact members 19 are secured in firm assembly within the socket body against a rocking motion with respect to the walls of the openings 9 when the prong terminals of a vacuum tube are pushed into electrical engagement with the legs 22 and 23.

The socket unit is assembled with the supporting panel 1 by moving the terminal portions of the contact members 10 and 11 through appropriately positioned slot-like apertures 40 (Fig. 1) of the panel 1 until the side surface 7 of the socket body abuts the surface 3 of the panel. After this action, the parts of the terminal portions 25 and 33 on the opposite side of the panel 1 from the socket unit are twisted in the manner well known in the art to engage portions of the terminals behind the panel thereby securing the socket unit in firm attachment to the same. The twisting action in cooperation with the closed end surface 6 of the socket body effects a final and complete assembly of the prong-engaging portions of the contact members within the openings 9 and 9a so that they receive and engage efficiently the prongs 21 of the cooperating vacuum tube.

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 a prong-receiving opening extending into said body from one end, a contact member having a resilient prong-engaging portion disposed within said opening, said prong-engaging portion comprising a pair of leg elements joined at one end of said prong-engaging portion and adapted to receive between them a prong terminal, one of said legs being of bent construction and engaging resiliently opposed sides of said opening whereby said contact member is maintained in assembly with said body, and a terminal portion extending from said prong-engaging portion.

2. An electrical socket comprising a socket body having a prong-receiving opening extending into said body from one end, a contact member having a resilient prong-engaging portion disposed within said opening, said prong-engaging portion being of U-shape having leg portions joined at one end of said prong-engaging portion, said legs having oppositely facing narrow edges to engage between them a prong terminal, one of said legs being bent laterally out of the normal plane of the broad sides of said legs and engaging resiliently opposed sides of said opening whereby said contact member is maintained in assembly with said body, and a terminal portion extending from said prong-engaging portion.

References Cited in the file of this patent

UNITED STATES PATENTS

1,984,036	Schwartzmann	Dec. 11, 1934
2,193,940	Schmitt	Mar. 19, 1940
2,333,694	Warsher	Nov. 9, 1943
2,343,675	Kenyon	Mar. 7, 1944
2,613,244	Del Camp	Oct. 7, 1952
2,759,223	Del Camp	Aug. 21, 1956
2,760,176	Del Camp	Aug. 21, 1956