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2,296,454

CIRCUIT CONNECTOR STRUCTURE

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Fig. 1.

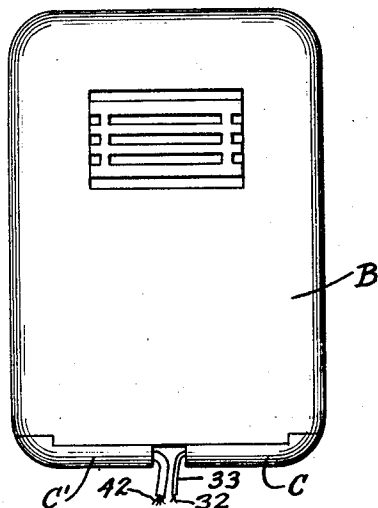
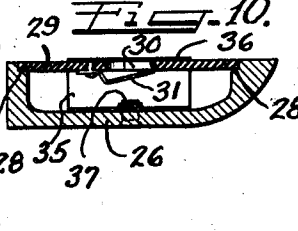
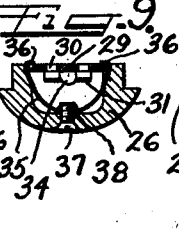
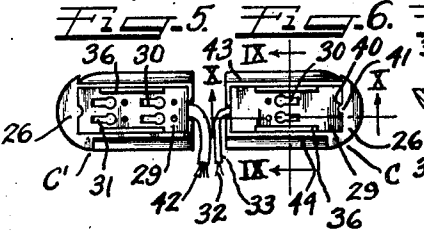
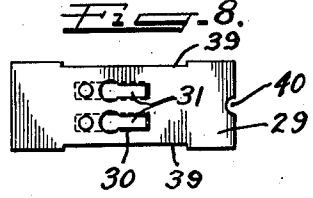
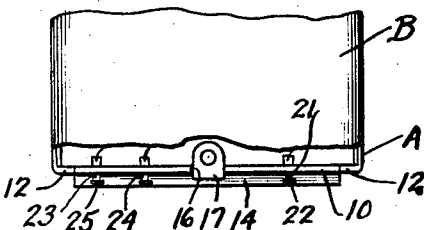
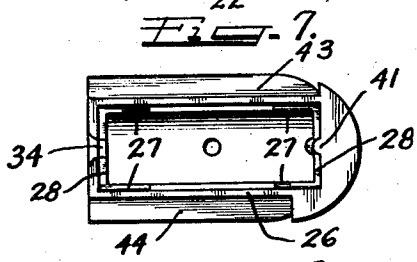
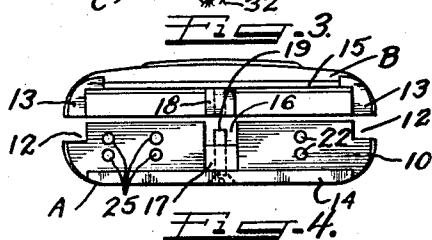
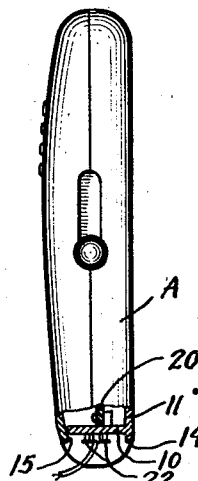


Fig. 2.



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UNITED STATES PATENT OFFICE

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CIRCUIT CONNECTOR STRUCTURE

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2 Claims. (Cl. 173—334)

My invention relates to circuit connector structure designed more particularly for use in hearing aid outfits for connecting the conductors from the battery pack and the ear piece with the terminals on the casing containing the microphone and sound amplifying elements.

An important object of the invention is to provide simple and compact terminal members for the battery and ear piece conductors which are readily applied to or detachable from terminals on the microphone case and which connector members are held in service position by keyhole slot engagement with the microphone case terminals.

Another important object is to provide improved means for holding in the housings or shells of the connector members the insulating plates which have the keyhole slots and which support behind the slots the terminal contacts for the battery and ear piece conductors.

My invention also includes other features of construction and arrangement, and all of the features are incorporated in the structure shown on the drawing, in which drawing—

Figure 1 is a front view of the microphone casing showing the location of the connector members thereon;

Figure 2 is an edge view partly in section;

Figure 3 is a lower end view showing the body and cover of the casing partially separated;

Figure 4 is a front elevation of the lower end of the casing with part of the cover broken away;

Figure 5 is an inner side view of one of the connector members;

Figure 6 is an inner side view of the other connector member;

Figure 7 is an enlarged inner side view of the connector body;

Figure 8 is a plan view of the terminal plate;

Figure 9 is an enlarged transverse section in plane IX—IX Fig. 6; and

Figure 10 is an enlarged longitudinal section on plane X—X Fig. 6.

The microphone casing shown is rectangular and comprises the body part A and the cover part B. These casing parts are preferably molded of suitable material so as to be as light as possible. The bottom wall 10 of the casing extends from and is part of the back wall 11 of the body and this bottom wall forms seats for the connector members C and C'. As shown on Fig. 3, the bottom wall has the end recesses 12 for receiving the bottom wall portions 13 of the cover. The flange 14 at the lower end of the back wall 11 projects a distance beyond the bottom wall

10 and terminates in line with the inner walls of the recesses 12. A flange or lip 15 at the lower end of the front wall of the cover B projects a distance beyond the bottom wall 10, these lips forming opposed walls between which the connector members C and C' are aligned. The bottom wall 10 has the transverse passageway 16 intermediate its ends and at the bottom of this passageway is a lug 17 which projects a distance beyond the lower face of the bottom wall 10. At its upper end the passageway 16 receives the lug 18 on the cover, this lug being threaded to receive a screw 19 extending through the back wall 11 and the lug 17, this screw and other screws (not shown) serving to hold the cover to the body. The projecting end of the lug 17 may serve as a stop for the connector members when they are applied to the casing.

Within the casing body A is supported a plate 20 of insulating material on which the various microphone, amplifying and circuit controlling devices (not shown) are mounted. At one end of the bottom wall 10 a pair of terminal pins 21 extending therethrough and terminate in heads 22, these terminal pins receiving the connector member C from which wires extend to an ear piece (not shown). At the other end of the bottom wall 10 two pairs 23 and 24 of contact pins extend therethrough and terminate in heads 25, these contact pins receiving the connector member C' from which wires extend to A and B batteries (not shown) for a hearing aid outfit.

The connector members C and C' are of like construction except that the connector member C carries only one pair of contacts for connection with the terminal pins 21 while the connector C' carries two pairs of terminal contacts for engagement with the terminal pins 23 and 24. Each connector comprises a body or shell 26 of suitable material and of rounded or arcuate cross section. The body has internal shoulders 27 on its longitudinal walls and shoulders 28 on its end walls, these shoulders forming a seat for a terminal plate 29 of insulating material. In the plate 29 of the connector C there are a pair of longitudinally extending keyhole slots 30 for receiving the terminal pins 21 on the microphone casing and contact springs 31 are secured against the back of the plate at the outer or circular ends of the keyhole slots, these springs extending behind the slots for electrical engagement with the terminal pins 21. The contact springs are connected with the conductors 32 which connect with an ear piece, a protecting insulating rubber tube 33 receiving the conductors and extending

through a passageway 34 provided in the inner end wall of the connector body.

As a simple and efficient means for detachably holding the terminal plate 29 against its seating shoulders, I provide a clamp 35. This clamp is a plate of spring sheet metal of substantially semi-circular cross-section with its end portions deflected inwardly to provide tongues 36. As shown on Fig. 7, the side shoulders 27 continue only a short distance from the end shoulders 28 and the clamping plate 35 engages and is aligned in the body 26 between the ends of the side shoulders with its tongues 36 overlapping the terminal plate 29 along the sides thereof. Detachable fastening means, such as a screw 37, extends through the bottom wall of the body 27 for threaded engagement with the threaded hole 38 in the clamping plate so that when the screw is tightened, the plate will be drawn down for engagement of its tongues 36 with the terminal plate to hold the plate securely against the seating shoulders in service position. As shown on Figs. 6 and 8, the terminal plate 29 along its sides may have the shallow recesses 39 for receiving the sides of the clamp, and the clamp may be primarily sprung open a distance so that the terminal plate may be readily inserted between the ends thereof, and then when the plate with the clamp is inserted into the connector body, the sides of the clamp will engage with the sides of the body and will be moved inwardly for overlapping of the terminal plate by the clamp tongues 36, and then when the screw 37 is applied and secured, the terminal plate will be rigidly held in its proper aligned position on the seating shoulders 27 and 28. The terminal plate may also have a recess 40 in its outer end for receiving an aligning projection 41 at the outer end of the connector body. The keyhole slots and the terminal springs on the connector terminal plate will thus be held in proper alignment for engagement with the terminal pins on the microphone case when the connector is applied thereto.

The connector C' is of the same construction and arrangement as the connector C except that it has two pair of keyhole slots and two pair of contact springs, these contact springs forming the terminal of wires 42 which extend to the battery pack for the hearing aid outfit. When the connectors are to be attached to the microphone case, they are first applied to receive the heads of the casing terminal pins through the circular ends of the keyhole slots, and then an inward shift of the connector on the casing body wall will bring the narrower outer ends of the keyhole slots into position below the terminal pin heads and the connectors will then be locked in service position. The connector bodies have the recesses or channels 43 and 44 along their sides for receiving the tongues 14 and 15 on the body parts A and B, respectively, of the microphone casing so that the connectors will be held by these tongues in proper alignment on the casing. The connector backs being transversely rounded and their ends being also rounded, the connectors will form the rounded end and corners of the microphone casing. The connectors are of a length so that when in service position on the microphone casing they will leave sufficient space for the wires 32 and 42 leading therefrom.

As the terminal springs on the connectors are normally inclined toward the keyhole slots, application of the connectors to the microphone case will effect deflection of the springs and wiping engagement thereof with the microphone case terminal pins so that clean and efficient electrical contact is assured. As the connectors are supported entirely on the bottom wall of the casing body A, the casing cover B may be removed at any time without disturbing the connectors. To remove the connectors from the casing, they are shifted a short distance outwardly until the large ends of the keyhole slots register with the heads of the terminal pins, then the connectors may be readily withdrawn from the casing.

I have shown practical and efficient embodiment of the features of my invention but I do not desire to be limited to the exact construction and arrangement shown and described as changes and modifications may be made without departing from the scope of the invention.

I claim as follows:

1. A rectangular microphone casing for hearing aid outfits having a bottom wall with depending flanges along the sides thereof, a set of headed terminals extending through said bottom wall at each side of the middle thereof and connected with circuits within the casing, a detachable connector unit for each set of terminals comprising a body shaped to fit against said bottom wall and to receive said flanges to form a continuation of the side and edge walls of the casing for presenting a rounded bottom and corner, a terminal plate secured in each connector body, and terminal contacts supported on said terminal plate, each terminal plate having keyhole slots in front of the terminal contacts for receiving the respective headed terminals on said bottom wall whereby said connector units are held intimately against said bottom wall in service position on said casing, each connector unit having at its inner end a passageway for circuit wires connected with the terminal contacts and said units when applied leaving a space between their inner ends for passage of the circuit wires to the exterior of the casing.

2. A rectangular microphone casing for hearing aid outfits having headed terminal pins extending therefrom, a connector unit comprising an oblong shell open at one side and having internal seating shoulders along said open side, a terminal plate fitting into said shell and seating on said shoulders to form a closure for the shell, contacts on said terminal plate, a bowed clamping plate disposed transversely within said shell with its sides extending outwardly between said shell and said plate along the longitudinal edges thereof and terminating in clamping tongues overlapping said terminal plate, and a screw extending through the bottom of said shell and threading through said clamping plate intermediate its ends for exerting tension thereon to cause said terminal plate to be clamped against said shoulders by said tongues, said terminal plate having keyhole slots in front of the terminal contacts for interlocking engagement with said headed terminal pins.

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