Dec. 24, 1940. W. P. HERMAN 2,226,433

MULTIPLE CONNECTOR

Filed Nov. 2, 1939 2 Sheets-Sheet 1

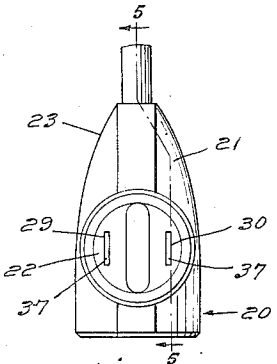


Fig. 1

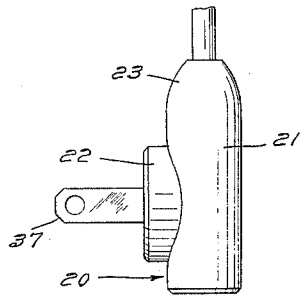


Fig. 2

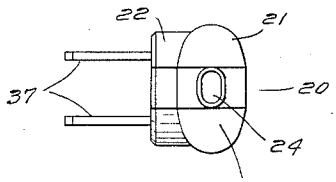


Fig. 3

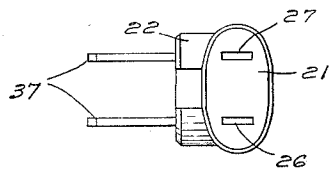


Fig. 4

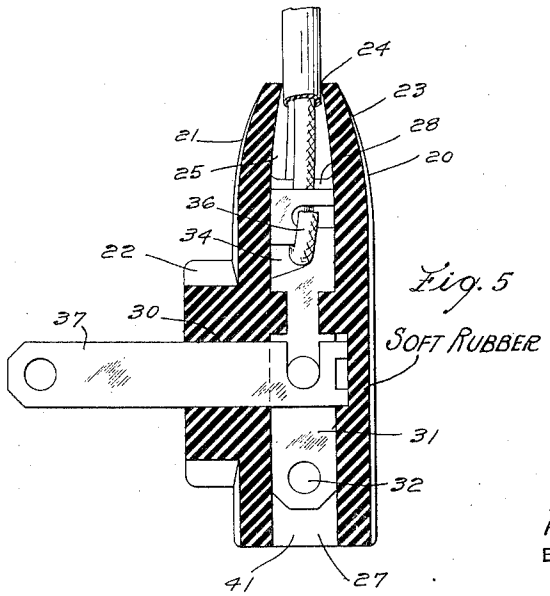


Fig. 5

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MULTIPLE CONNECTOR

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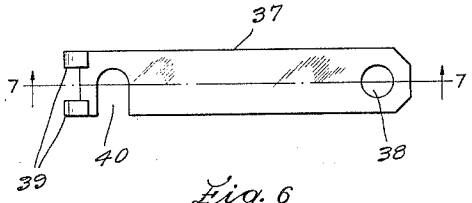


Fig. 6

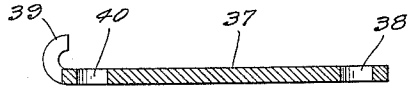


Fig. 7

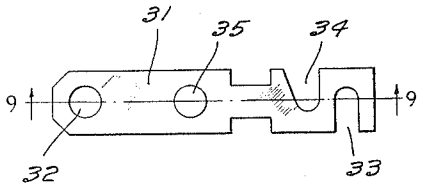


Fig. 8

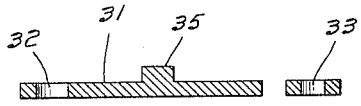


Fig. 9

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UNITED STATES PATENT OFFICE

2,226,433

MULTIPLE CONNECTOR

William P. Herman, Providence, R. I.

Application November 2, 1939, Serial No. 302,474

9 Claims. (Cl. 173—334)

My present invention relates to the manufacture of a one-piece connector element, and has particular reference to a novel construction of L-shaped connector and a novel method of assembly of the same.

It is the principal object of my invention to provide an L-type connector in which the connector body is made of an integral, one-piece, resilient material such as soft rubber.

It is an additional object of my invention to provide an L-type connector in which the various parts of the connector are anchored together without the use of screws, bolts, or other outside anchoring means.

It is a further object of my invention to provide an L-type connector in which the various parts of the connector are anchored together without distorting the connector body.

A further object of my invention is to provide a novel method of assembly for mounting the contact elements in the connector body and for anchoring the elements within the connector body.

Another object of my invention is to provide an L-type connector which will permit the connector body to lie flat against the wall receptacle.

Another object of the invention is to provide an L-type connector which can be easily and economically assembled by machine.

With the above and other objects and advantageous features in view, my invention consists of a novel arrangement of parts and a novel method of manufacture and assembly, more fully disclosed in the detailed description following, in conjunction with the accompanying drawings, and more specifically defined in the claims appended thereto.

In the drawings:

Fig. 1 is a front elevation of an L-type connector embodying my invention;

Fig. 2 is a side elevation thereof;

Fig. 3 is a top plan view thereof;

Fig. 4 is a bottom view thereof;

Fig. 5 is an enlarged detailed section taken along line 5—5 on Fig. 1;

Fig. 6 is a plan view of one of the horizontal contact elements;

Fig. 7 is a section taken along line 7—7 on Fig. 6;

Fig. 8 is a plan view of one of the vertical contact elements; and

Fig. 9 is a section taken along line 9—9 on Fig. 8.

Multiple service connectors have heretofore been constructed in the conventional design disclosed in my copending application Serial No. 235,336, filed October 17, 1938, issued as Patent No. 2,210,215 on August 6, 1940. However, instead of a connector body portion having four outlet sections, it has occasionally been found practicable to use a flatter connector body portion having only three outlet sections and designed to lie flat against the wall receptacle. Such a construction permits the use of a pair of contact elements for entering the wall receptacle, and provides two additional outlets one of which usually is provided with a cord lead wire and the other of which provides a female receptacle portion for receiving the usual plug cap. The present invention provides a novel type of flat connector body portion having three connector sections, which is made of an integral, one-piece body and resilient material and which is assembled easily and economically by machine, and in which the connector elements and cord lead connections are anchored without distorting the body portion and without the use of screws or other outside clamping means.

Referring to the drawings illustrating my invention, the connector element 20 comprises an integral, one-piece molded body of resilient material such as soft rubber, and comprises a vertical portion 21 and an integral laterally extending portion 22. The vertical portion 21 is preferably flat, and the lateral portion 22 extends from one face of the flat vertical portion 21.

In the illustrated form, the vertical portion 21 is preferably tapered at the upper end thereof as at 23, the tapered portion 23 terminating in a central cable opening 24. The opening 24 opens into an upper cable recess 25 communicating with spaced parallel slots 26 and 27 which extend downwardly through the vertical portion 21. Integrally formed with the internal portion of the connector element 20 and between the upper end of slots 26 and 27 is a baffle 28 extending partially into the upper cable recess 25. The baffle 28 is of the same material as the plug body and is designed to prevent short circuiting and arcing between the upper ends of the contact elements and the cord lead connections.

The laterally extending portion 22 is provided with spaced parallel slots 29 and 30 extending into the vertical portion 21 and intersecting the slots 26 and 27. Slots 29 and 30 extend slightly beyond the slots 26 and 27 but not through the vertical portion 21; the inner ends of the slots being enlarged to accommodate the hereinafter

to be described lugs 39 on the horizontal contact elements.

While any conventional type of interlocking device may be used for anchoring the contact elements in the slot such as struck-up lugs or tangs, I prefer to use the type of anchoring device in which the slots are provided with restricted slot portions with shoulders and the contact elements are provided with complementary cut-out portions so that the anchoring of the contact elements in the slots is accomplished without distorting the connector body and without the use of screws or other outside clamping means.

The vertical slots 26 and 27 are provided with the type of contact elements shown in Figs. 8 and 9. Each contact element 31 comprises a elongated integral flat metallic portion preferably stamped from sheet stock and having a lower opening 32 for the purpose of assembly. The upper end of the element 31 is provided with a lateral slot 33 extending inwardly from one edge of the contact element and below that a second lateral slot 34 extending inwardly and at a slight downward angle from the other edge of the contact element. Slots 33 and 34 are for the purpose of anchoring the electrical cord lead connection in a manner hereinafter to be described. The central face of the body of the element 31 is provided with a projection 35 preferably annular in cross section and at least the thickness of the contact element 31. The projection 35 may be formed integrally with the contact element, as by extruding, or may be soldered or separately attached thereto in any suitable manner.

In assembling the vertical contact element 31 into the vertical portion of the connector body 21, the electrical cord lead connections 36 are bared at their ends and the bare ends are spot welded, soldered, or attached in any other suitable manner to the upper edge of the blade 31 adjacent the lateral slot 33. The cord lead wire is then pulled into the slot 33 across the intervening portion between the slots 33 and 34 and into the slot 34 and around and upwardly. The intertwining of the cord lead connection 36 between the slots 33 and 34 will serve to anchor the cord lead connection to the connector element, and will provide the necessary strain relief required by the Underwriters. The cord lead connection is preferably made to the vertical contact element prior to their assembly, and the element 31 with the cord lead connection may be assembled into the vertical slots 26 and 27 in any suitable manner but preferably by a machine of the type disclosed in my copending application entitled Contact plug assembly apparatus, Serial No. 99,848, filed September 8, 1936, issued as Patent No. 2,198,966 on April 30, 1940.

The contact elements 37, illustrated in Figs. 6 and 7, are designed to fit into the lateral slots 29 and 30 in the portion 22. The elements 37 are also preferably stamped from flat sheet stock and may be provided at their outer ends with openings 38 required by the Underwriters. The inner end of each contact element 37 is provided with integral, reentrantly bent lugs or projections 39 and a lateral slot 40 adjacent the inner end. In assembly, when the elements 37 are positioned in the slots 29 and 30, the lugs 39 will hook around the edges of the elements 31 and the projection 35 on the element 31 will enter into the slot 40 so that the contact elements will be interlocked against accidental removal. If desired, the pin and slot arrangement may be disposed with and the lugs 39 may be used alone to interlock the contact elements.

The elements 37 are of sufficient length to extend outwardly from the lateral portion 22 and the outwardly extending portions are designed to be pushed into the conventional wall receptacle so that the flat surface of the vertical portion 21 of the connector element is parallel with the wall and flat against the wall. The lower end of the vertical element 31 extends to just short of the lower end of the vertical slots 26 and 27 with a portion of dielectric material 41 between the end of the slot and the end of the connector element. This provides a female receptacle portion into which contact elements on a conventional connector cap may be pushed and the additional lower dielectric material 41 acts as a snuffer to prevent arcing when the connector cap is being pushed into or pulled out of the slot. Furthermore, the central cable opening 24 may be of slightly smaller diameter than the cable or cord lead wire 36 so that after they have been returned to their normal position and the cable has been pulled into the connector element body 20, there will be a gripping action tending to additionally hold the cable within the connector element body.

While I have described a form of connector element having a pair of protruding contact elements for insertion into a wall receptacle and a plurality of service openings one for the reception of a conventional connector cap and the other for the attachment of a cord lead connection which will permit the extension of a cord lead wire, it is obvious that the cord lead wire can be eliminated and that both ends of the vertical connector element 31 may be made alike and both ends of the vertical slots 26 and 27 may be made alike so that when the elements are pulled into the vertical slots instead of a cord lead connection, as shown, the connector element body will be provided with two oppositely disposed female connector elements which will permit the attachment of two separate conventional connector caps.

The use of the above-described construction and of the preferred method of manufacture and assembly provides a multiple L-shaped connector which comprises an integral, one-piece body of resilient material, which is easy and economical to manufacture and assemble and which is flat, unbreakable, and which can be readily used behind pieces of furniture such as a radio, etc. without scratching or breaking.

While I have described a specified embodiment of my invention, and a specific method for manufacture and assembly, it is obvious that these are merely illustrative, and that changes in the size and shape of the parts, in the materials used for the parts, their relative arrangement, and in the assembly method desecribed, may be made to suit requirements for different connector body designs without departing from the spirit and the scope of the invention as defined in the appended claims.

I claim:

1. In a connector element, an integral one-piece body of molded soft resilient material having an upper cable recess and two slots extending vertically therefrom through said element, said body having an integral auxiliary portion extending at right angles thereto and having two horizontal slots extending from the outer surface thereof and terminating at said vertical slots, and pairs of contacts mounted within said slots in

electrical and mechanical interlocking engagement with each other.

2. In a connector element, an integral one-piece body of molded soft resilient material having an upper cable recess and two slots extending vertically therefrom through said element, said body having an integral auxiliary portion extending at right angles thereto and having two horizontal slots extending from the outer surface thereof and terminating at said vertical slots, and pairs of contacts mounted within said slots in electrical and mechanical interlocking engagement with each other, said body constituting yielding resilient means for retaining said contacts within said slots.

3. In a connector element, an integral one-piece body of molded soft resilient material having an upper cable recess and two slots extending vertically therefrom through said element, said body having an integral auxiliary portion extending at right angles thereto and having two horizontal slots extending from the outer surface thereof and terminating at said vertical slots, and pairs of contacts mounted within said slots, one contact of each pair being in electrical and mechanical interlocking engagement with one contact of the other pair.

4. In a connector element, an integral one-piece body of molded soft resilient material having an upper cable recess and two slots extending vertically therefrom through said element, said body having an integral auxiliary portion extending at right angles thereto and having two horizontal slots extending from the outer surface thereof and terminating at said vertical slots, and pairs of contacts mounted within said slots in electrical and mechanical interlocking engagement with each other, the pair of contacts in said horizontal slots extending beyond said body to provide means for establishing electrical energization for all of said contacts.

5. In a connector element, an integral one-piece body of molded soft resilient material having an upper cable recess and two slots extending vertically therefrom through said element, said body having an integral auxiliary portion extending at right angles thereto and having two horizontal slots extending from the outer surface thereof and terminating at said vertical slots, pairs of contacts mounted within said slots, one contact of each pair being in electrical and mechanical interlocking engagement with one contact of the other pair, and a pair of electrical conducting wires extending into said cable recess in electrical conducting engagement with the contacts in said vertical slots.

6. In a connector element, an integral one-piece body of molded soft resilient material having an upper cable recess and two slots extending vertically therefrom through said element, said body having an integral auxiliary portion extending at right angles thereto and having two horizontal slots extending from the outer surface thereof and terminating at said vertical slots, and pairs of contacts mounted within said slots in electrical and mechanical interlocking engagement with each other, said vertical slots being of greater length than the contacts therein whereby flexible slots mouths beyond the ends of said contacts are provided.

7. In a connector element, an integral one-piece body of molded soft resilient material having an upper cable recess and two slots extending vertically therefrom through said element, said body having an integral auxiliary portion extending at right angles thereto and having two horizontal slots extending from the outer surface thereof and terminating at said vertical slots, and pairs of contacts mounted within said slots in electrical and mechanical interlocking engagement with each other, the pair of contacts in said horizontal slots extending beyond said body to provide means for establishing electrical energization for all of said contacts, said vertical slots being of greater length than the contacts therein whereby flexible slot mouths beyond the ends of said contacts are provided.

8. In a connector element, an integral one-piece body of molded soft resilient material having an upper cable recess and two slots extending vertically therefrom through said element, said body having an integral auxiliary portion extending at right angles thereto and having two horizontal slots extending from the outer surface thereof and terminating at said vertical slots, and pairs of contacts mounted within said slots, one pair of said contacts each having a pin and the other pair of said contacts each having a slot adapted to receive said pin, whereby said contacts are in electrical and mechanical interlocking engagement with each other.

9. In a connector element, an integral one-piece body of molded soft resilient material having an upper cable recess and two slots extending vertically therefrom through said element, said body having an integral auxiliary portion extending at right angles thereto and having two horizontal slots extending from the outer surface thereof and terminating at said vertical slots, and pairs of contacts mounted within said slots, one pair of said contacts each having a pin and the other pair of said contacts each having a slot adapted to receive said pin, the contacts in said horizontal slots having integral reentrantly bent lugs at their inner ends adapted to hook over the edges of said vertical contacts, whereby said contacts are in electrical and mechanical interlocking engagement with each other.

WILLIAM P. HERMAN.