

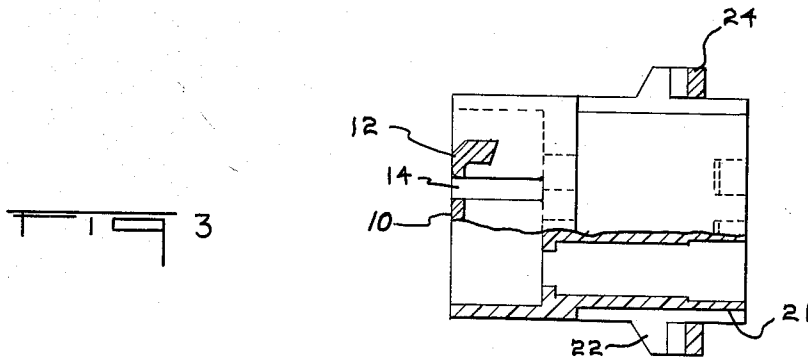
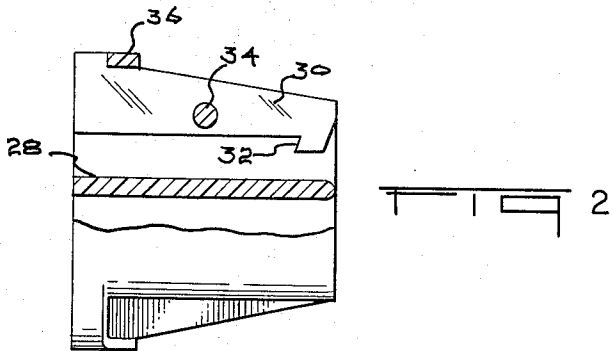
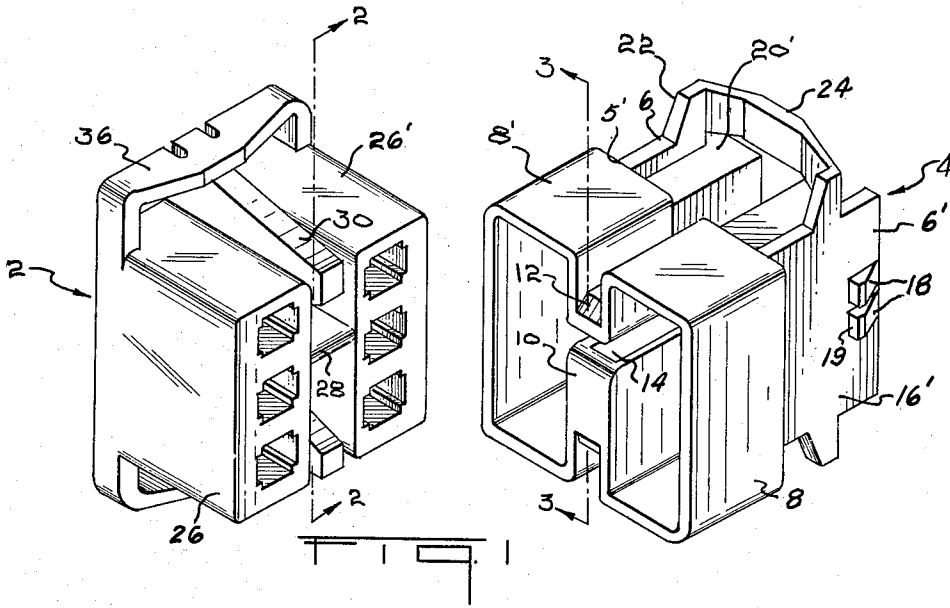
April 20, 1965

R. DE LYON
ELECTRICAL CONNECTOR HOUSING HAVING PANEL
MOUNTING AND LATCHING MEANS

3,179,738

Filed Nov. 7, 1962

2 Sheets-Sheet 1



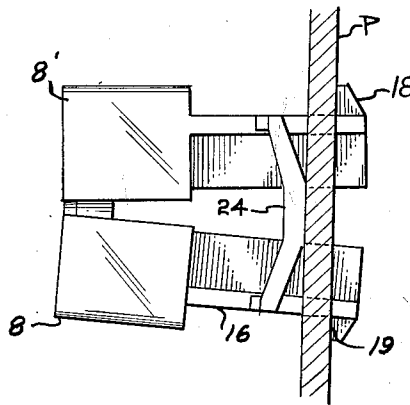
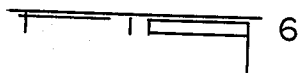
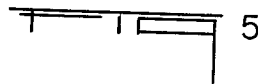
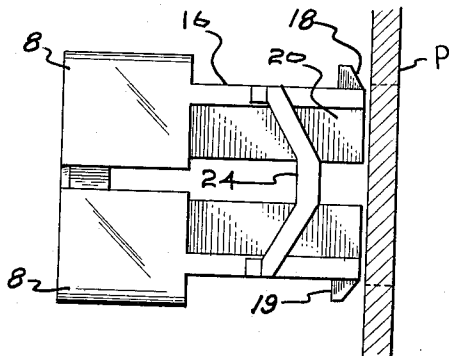
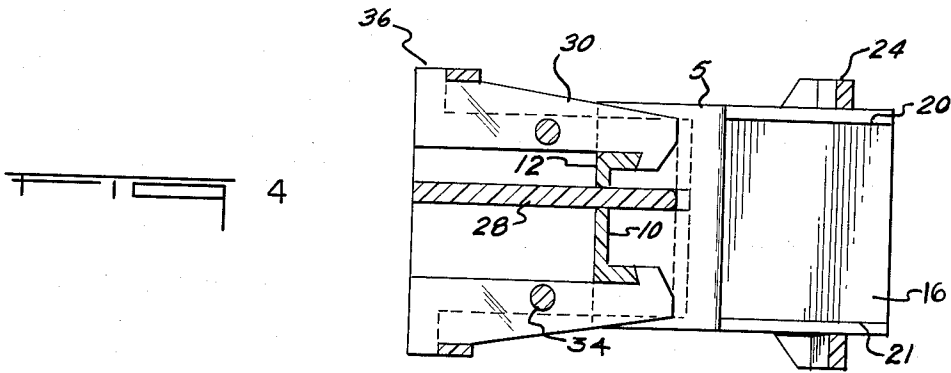
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**ELECTRICAL CONNECTOR HOUSING HAVING
PANEL MOUNTING AND LATCHING MEANS**

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Filed Nov. 7, 1962, Ser. No. 236,001

7 Claims. (Cl. 174-50)

This invention relates to separable electrical connector assemblies for disengageably connecting a plurality of conductors.

An object of the invention is to provide an improved separable connector housing, both parts of which can be formed as a unitary molding. A further object is to provide a connector housing having positive latching means for holding the two parts of the connector in engagement with each other. A still further object of the invention is to provide a housing having improved means for mounting on a panel or wall. A still further object is to provide an electrical connector which can be mounted on walls of varying thickness and through openings of varying dimensions.

These and other objects of the invention are achieved in a preferred embodiment comprising a two-part electrical connector assembly, one part, the socket of the disclosed embodiment, of which is adapted to be mounted in an opening in a panel or a wall. This socket part which is mounted in the panel opening comprises two substantially similar housing units disposed in side-by-side relationship and integrally joined at their forward ends by means of integral struts in a manner such that the rearward ends of the housing units can be moved relatively towards each other upon deformation of the struts. By virtue of this arrangement, this socket part of the connector assembly can be inserted partially through an opening in the panel. Forwardly facing abutments are provided on the oppositely facing sides of the housing units so that after partial insertion of the housing units through the panel opening, these abutments or shoulders will bear against the one side of the panel and prevent withdrawal thereof from the panel. In order positively to lock this connector part to the panel, I provide flexible stops in the form of a bridge or a beam supported at each end which connects the remaining pairs of adjacent sides of the housing units. These flexible stops each have a rearwardly facing surface, the plane of which is parallel to the planes of the abovementioned abutments or shoulders so that the stops are resiliently deformed and bear against the opposite side of the panel after insertion. The stops thus function to press the shoulders against the panel and securely lock the connector part in place.

The mating section of the connector, the plug, comprises two housing units which are spaced apart and integrally joined along their opposing sides by a strut member and which are adapted to enter the forward ends of the housing units of the socket part. Latch means for securing the two connector parts together after assembly is provided in the form of a pair of latch bars located between the two housing units of the plug and mounted on integral struts which extend between the housing units, the struts, the housing units, and the latch bars being formed as an integral molding. At their rearward ends, the latch bars have projecting finger grip portions which extend beyond the surface of the housing while their forward ends have reversely directed hooks for engagement with the connecting struts of the socket portion of the assembly. The two parts of the connector assembly can thus be engaged with each other by merely grasping the finger grip sections of the latching bars of the plug portion, depressing these latch bars, moving the

connector parts into engagement with each other and releasing the latch bars to permit their hooked ends to engage the strut members of the socket portion.

In the drawing:

FIGURE 1 is a perspective view of a connector plug and socket in accordance with the invention.

FIGURES 2 and 3 are views taken along the lines 2-2 and 3-3 of FIGURE 1.

FIGURE 4 is a sectional view showing the plug and socket portions in engagement with each other and illustrating the function of the latching bars.

FIGURES 5 and 6 are views illustrating the manner in which the socket member is mounted in an opening in a panel or wall.

Referring first to FIGURE 1 in the drawing, the disclosed embodiment of the invention comprises a connector assembly consisting of a plug section 2 and a socket section 4, each of which sections contains a plurality of cavities for reception of terminal contacts. Socket section 4 is made up of two substantially identical housing units 5, 5' each of which has a relatively enlarged rectangular forward section 8, 8' and an integral rectangular rearward section 6, 6'. The two housing units are integrally joined by means of struts, 10, 12 which are integral with the opposing faces of forward sections 8, 8'. These struts are separated by an off-center slot 14 and extend only partially along the opposing walls of the forward housing sections 8, 8' so that the rearward ends of the housing sections 6, 6' can be moved relatively towards and away from each other with concomitant elastic deformation of the struts. The rearward sides of these struts function as shoulders for engagement by a latch arm as more fully described below.

The sides 16, 16' of the rearward sections of the housing units which face outwardly and in opposite directions have adjacent to their extreme rearward ends, bosses 18, 18' which define forwardly facing shoulders 19. These shoulders are adapted to bear against one side of a panel P to which the socket section 4 is secured. The adjacent coplanar parallel sides 20, 20' and 21, 21' of the rearward sections are integrally joined by means of stops 24 which bridge these two members and which are integral with their remote sides 16, 16' by means of upstanding lugs or bosses 22, 22'. The stops 24 are preferably of a substantial width and are generally curved towards the rearward ends of the receptacle member so that they present a substantial bearing surface which is opposed in direction to the bearing surfaces of shoulders 19. These stops are again relatively flexible so that they can be elastically deformed during use as is described below.

When it is desired to mount the socket section 4 in an opening in a panel P having a width substantially equal to or slightly greater than the distance between the sides 16, 16' the socket is aligned with the opening as indicated in FIGURE 5 and forced through the opening until the shoulders 19, 19' bear against the right hand side of the panel as viewed in FIGURES 5 and 6. During movement of the receptacle through the panel, the stop 24 will be brought to bear against the lefthand side of the panel and will be flexed after the manner of a simple beam which is fixed at both ends. Thus, the stops 24 will tend to bias the two housing sections apart thereby to prevent accidental or unintentional removal of the housing receptacle from the panel. Advantageously, the distance between the plane of the shoulders 19 and the face of the stop 24 is less than the thickness of the panel in which the receptacle is mounted so that after mounting, the stops will not be permitted to return to their normal condition but will rather be slightly elastically deformed and provide a continuing resilient force which both hold the shoulders 19 closely against the opposite

side of the panel and biases the two housing sections 6, 6' away from each other.

The plug section 2 of my preferred embodiment comprises two substantially rectangular and substantially identical housing units 26, 26' which are secured together in side-by-side relationship by means of an integral flat web 28 extending between their opposed sides. The two housing units 26, 26' thus form a recess within which a latch arm 30 is disposed. The location of this web is off-center by the same amount as is the location of the slot 14, thus providing a convenient means of polarizing the two housing parts since they can be assembled in only the proper and intended manner by virtue of this off-center web and slot arrangement. Latching arms 30, are contained between the opposed faces of the housing units 26, 26' adjacent to the tops and bottoms of the units and are integral with a torsionally deformable pin 34 which is also integral with the opposed sides of the housing units. At their forward ends as viewed in FIGURE 2, the latch arms have inwardly directed hook portions 32 adapted to be engaged with the ends of the struts 10, 12 of the receptacle 4. At their rearward ends or their lefthand ends as viewed in FIGURE 2, the latch arms extend above the surfaces of the housing units and are integral with transverse finger piece sections 36. These finger piece sections extend across and bridge both of the housing units and are integral with each of the housing units at their ends.

It will be apparent that when it is desired to engage the two connector parts with each other, it is merely necessary to grasp the finger pieces 36 between the thumb and forefinger, press them together to torsionally deform the pin 34 and thereby raise the hooked ends of the latch arms, move the two parts into engagement with each other, and release the finger pieces.

The disclosed embodiment of the invention is provided with cavities adapted to receive the hermaphrodite type of contact terminal disclosed in U.S. Patent 2,891,103 although alternative types of contacts can be used. It will be understood that with this type of contact, the ends of the contacts in socket section 4 will be disposed in the hollow forward housing sections 8, 8' while the contacts in the plug 2 will be entirely contained in the cavities of the housing units 26, 26'.

A salient advantage of the invention is that it achieves both positive locking of one of the connector parts, the socket 4, to the panel (by virtue of the beam action stops 24 in cooperation with the shoulders 19) and positive locking of the plug member 2 to the socket member 4 by virtue of the latching mechanism comprising the latch arms. Moreover these functions are achieved in a manner such that both the plug and the socket member can be made as a single integral molding of a suitable relatively firm plastic material such as a suitable nylon. The socket member 4 can, moreover, be mounted in panels of varying thickness and in openings of varying size.

Changes in construction will occur to those skilled in the art and various apparently different modifications and embodiments may be made without departing from the scope of the invention. The matter set forth in the foregoing description and accompanying drawings is offered by way of illustration only. The actual scope of the invention is intended to be defined in the following claims when viewed in their proper perspective against the prior art.

I claim:

1. An electrical connector housing having two disengageable parts, each part being a unitary molding of an insulating material, a first part comprising a pair of side-by-side spaced-apart housing units connected together at their forward ends by flexible strut means integral with the opposed sides of said units, the rearward ends of said units being movable towards and away from each other with concomitant deformation of said strut

means, said rearward ends having forwardly facing shoulders on a first pair of oppositely facing sides of said housing units, and bridge means connecting the remaining adjacent sides of each of said housing units, said bridge means having bearing surface portions facing rearwardly of said first part whereby upon insertion of said first part through an opening, said opposite ends are permitted to flex towards each other with concomitant flexure of said bridge means, and after passage of said shoulder means through said opening, said bridge means biases said opposite ends apart and bears against said panel whereby said first part is retained in mounted position on said panel.

2. A device as set forth in claim 1 wherein the second disengageable part comprises a pair of spaced-apart housing units which are complementary to and matable with said first part, a latch arm between the opposed faces of said housing units of said second part, said latch arm being integral with a resilient torsionally deformable pin extending between and integral with said opposed faces and being engageable with said strut means of said first part to secure said parts together.

3. An electrical connector housing consisting of two disengageable parts, a first one of said parts comprising a pair of side-by-side spaced-apart housing units connected together at their forward ends by flexible struts integral with the opposed sides of said units, the opposite ends of said units being movable towards each other upon elastic deformation of said struts, said opposite ends having laterally extending forwardly facing shoulders on a first pair of opposite external sides of said first part, and bridges connecting the adjacent pairs of sides of said housing units of said first part, said bridges extending laterally beyond said adjacent sides and being bowed rearwardly of said first part whereby, upon insertion of said first part through an opening in a panel, said opposite ends are permitted to flex towards each other with concomitant flexure of said bridge means, and after passage of said shoulder means through said opening, said bridge means biases said opposite ends apart and resiliently bears against said panel to retain said first part in said panel, said second part comprising a pair of spaced-apart housing units which are complementary to and matable with said first part, a pair of latch arms between the opposed faces of said housing units of said second part, said latch arms each being integral with a torsionally deformable pin extending therebetween, said pin integral with said opposed faces, said latch arms being engageable with said strut means of said first part to secure said parts together.

4. An electrical connector housing consisting of two disengageable parts, each part comprising a unitary molding, a first one of said parts comprising a pair of side-by-side spaced-apart housing units connected together at their forward ends by strut means, the second one of said parts comprising a pair of spaced apart housing units connected by integral torsionally deformable pin means extending between their opposed faces, a latch arm integral with said pin means, said latch arm having a hooked forward end for latching engagement with said strut means of said first part, rearward portions of said latch arm projecting beyond the external surface of said second part thereby to permit rotary motion of said latch arm with concomitant torsional deformation of said pin upon engagement and disengagement of said parts.

5. An electrical connector housing consisting of two disengageable parts, each part comprising a unitary molding, a first one of said parts comprising a first pair of side-by-side spaced-apart housing units, a strut extending between the opposed sides of said first pair of housing units at the forward ends thereof, said strut being integral with, and connecting, said opposed sides, said strut having surface portions which are equally spaced from the two pairs of coplanar parallel sides of said first pair of housing units and extending only partially rearwardly of said first part,

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and an off-center slot in said strut, the second part of said housing consisting of a second pair of side-by-side spaced-apart housing units, an off-center web integral with the opposed faces of said second pair of housing units, said web being engageable with said slot thereby to polarize said two parts, and a pair of latch arms disposed between said second pair of housing units, said latch arms being integral intermediate their ends with pivot pins integral with said housing units, the forward ends of said arms having hook portions engageable behind said struts, and the rearward ends of said latch arms extending beyond the surfaces of said second part thereby to permit rotary motion of said latch arms upon engagement and disengagement of said parts.

6. An electrical connector housing comprising two disengageable parts, each part comprising a unitary molding, integral latch means for holding said parts in mated relationship comprising shoulder means on a first one of said parts and a latch arm on a second one of said parts, said latch arm having a hook on one end thereof, said latch arm being disposed in a recess in said second part and being integral with a pin extending transversely across said recess, said pin being integral with said second part and being torsionally deformable to permit rotation of said latch arm, and a finger piece on said arm on the end thereof which is opposite to said first end whereby, upon depression of said finger piece, said parts can be engaged with each other and upon release of said finger piece, said hooked end engages said shoulder means.

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7. An electrical connector housing comprising two disengageable parts, each part comprising a unitary molding, integral latch means for holding said parts in mated relationship, said latch means comprising shoulders on opposite sides of a first one of said parts and a pair of latch arms on opposite sides of a second one of said parts, each of said latch arms having hook means on one end thereof and each of said latch arms being disposed in a recess in said second part, said latch arms each being integral with torsionally deformable pins extending across said recesses, and each of said latch arms having a finger piece on its end which is opposite to said first end whereby, upon depression of said finger pieces said levers are swung about said pins to permit movement of said ends of said latch arms past said shoulder means and mating of said parts, and upon release of said finger pieces, said ends of said latch arms engage said shoulder means to hold said parts together.

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