

[54] **ELECTRICAL CONNECTOR AND MOUNTING MEANS**

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[58] Field of Search **339/91, 103, 104, 107, 339/128, 208**

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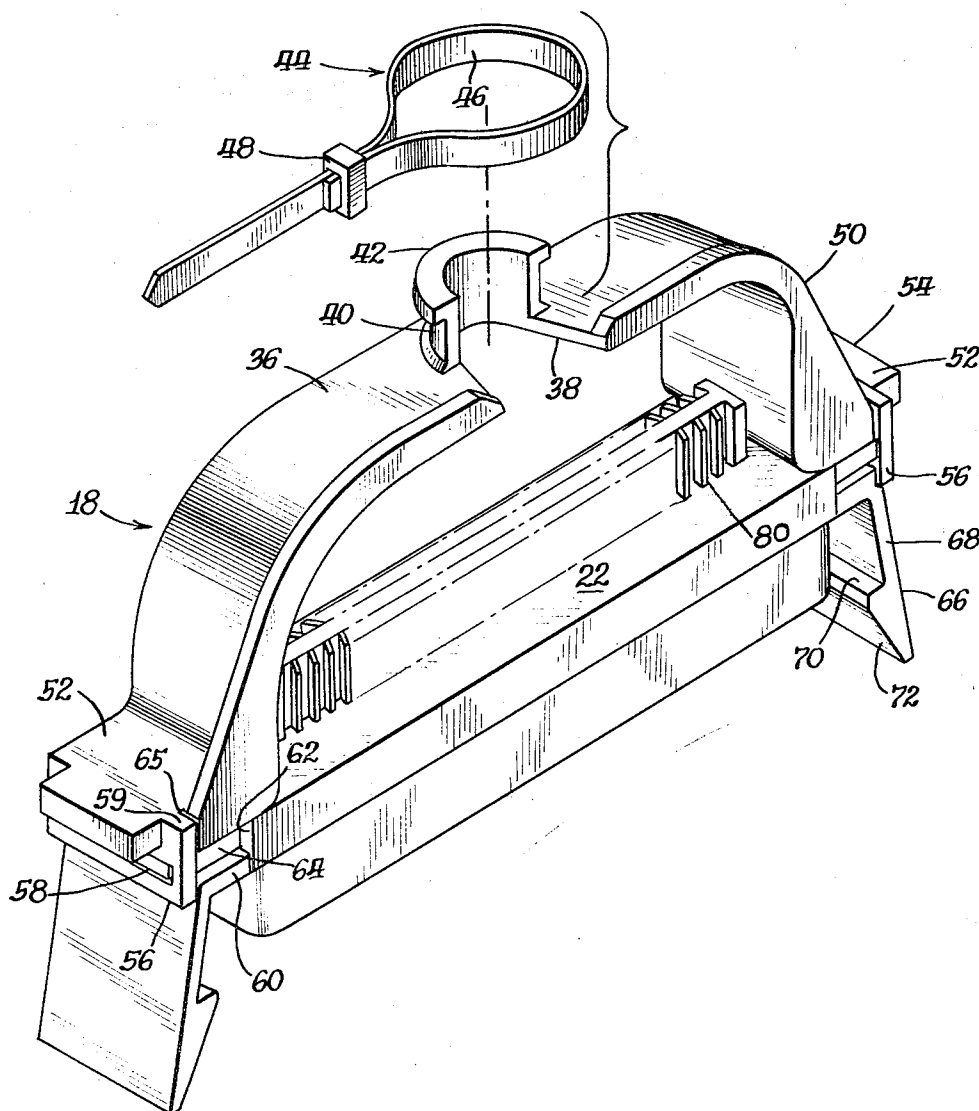
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[57] **ABSTRACT**

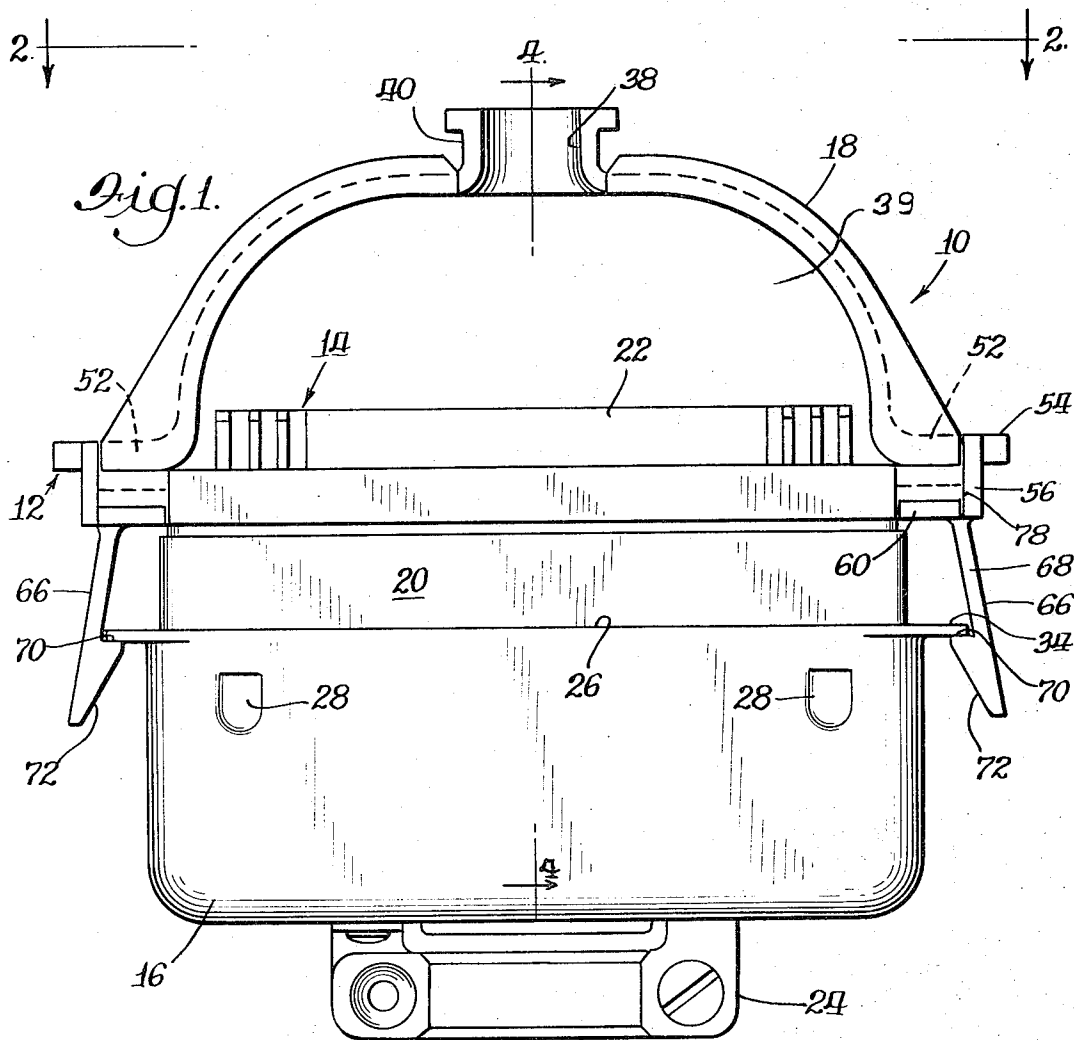
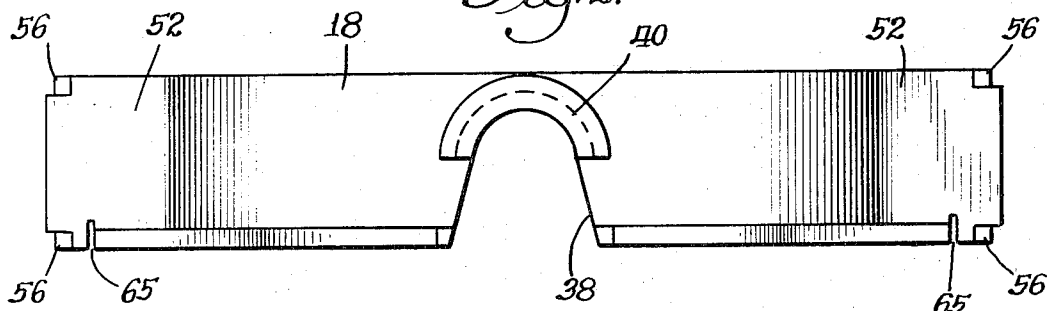
Electrical connector and mounting means therefor. The mounting means includes a container or "can" in which a first part of the connector is placed, and a shell or cable housing including the second part of the connector, the latter holding a cable the conductors of which are secured to the second part of the connector. The shell is an integral plastic piece and includes latching means and a strain relief collar for holding the cable. The shell is fitted to the container in a simple direct, snap-on movement, in which the connector parts are mated, and the shell latched to the container.

14 Claims, 4 Drawing Figures



SHEET 1 OF 2

Fig. 2.



SHEET 2 OF 2

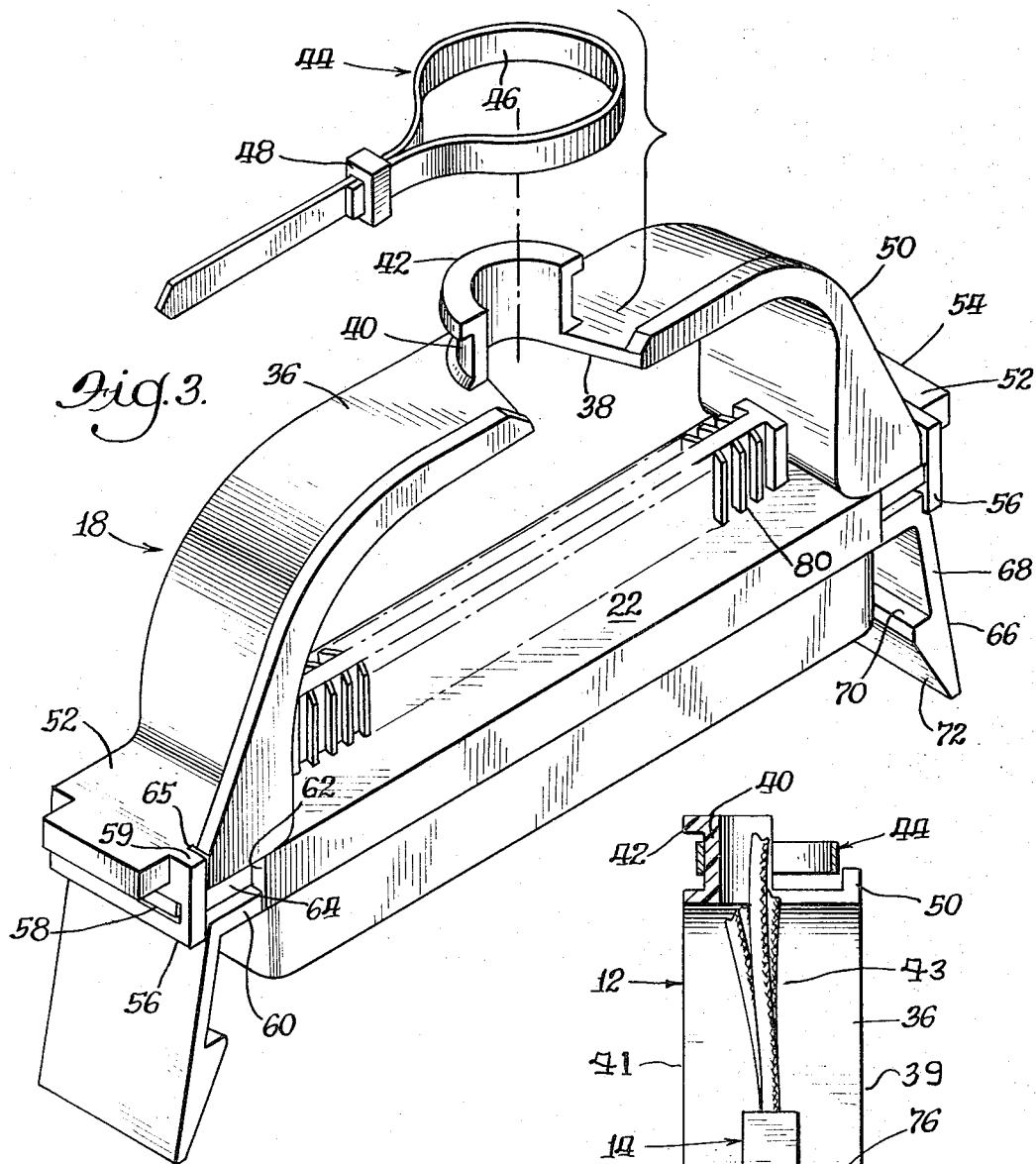
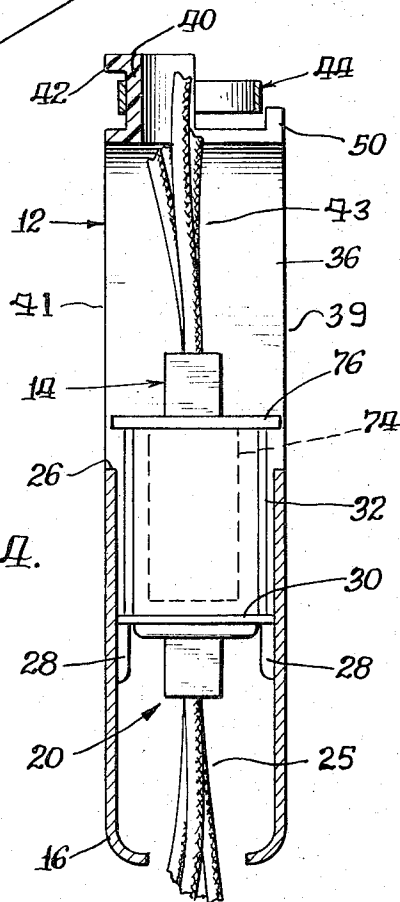


Fig. 4.



ELECTRICAL CONNECTOR AND MOUNTING MEANS

OBJECTS OF THE INVENTION

A broad object of the invention is to provide a simple and inexpensive mounting means for an electrical connector.

Another broad object is to provide such mounting means, which includes two separate members each having a connector part therein, which can be interconnected, for mating the connector parts, in the very simple step of moving the members together, and which include simple and effective latching means which normally, but releasably, hold the members together.

Another object is to provide, in mounting means of the general kind mentioned, a shell, which is one of the members, which is of simple and inexpensive construction, of integral construction and including latching elements and a strain relief element for use in securing a cable in the shell.

A further and more specific object is to provide a shell as just referred to, which is a one-piece molded plastic member, and hence inexpensive, and which is separate from the counterpart member, being mounted to the latter solely by detachable latching elements.

A still further object is to provide mounting means for a connector, having novel and efficient means for securing a cable therein for securement to the connector, providing a strain relief feature and enabling the cable to be so secured to the connector when out of the mounting means and thereafter placing the connector part and cable in the mounting means.

An additional object is to provide a shell constituting one member for mounting a connector, which is of such mechanical construction and design to render it particularly to molded plastic material, and hence of unusually inexpensive construction.

DESCRIPTION OF A PREFERRED EMBODIMENT

In the Drawings:

FIG. 1 is a side elevational view of the mounting means with the connector in place therein;

FIG. 2 is a top view taken at line 2—2 of FIG. 1, showing only the top member of the shell;

FIG. 3 is a perspective view of the top member or shell with a connector part therein, and a cable tie; and

FIG. 4 is a view taken at line 4—4 of FIG. 1, showing the mounting means members in section and the connector in elevation.

Referring in detail to the accompanying drawings, attention is directed first to FIGS. 1 and 4, showing the complete device including the mounting means with the connector in place therein.

The entire device is indicated in its entirety at 10 and includes a mounting means 12 and a connector 14 therein. The mounting means 12 includes two main members, namely, a container or "can" 16 and a shell or cable housing 18. The connector 14 in itself may be conventional at least in greater part, but with slight modifications for securement in the housing as referred to hereinbelow. The connector includes the usual plug 20, in this case mounted in the container 16, and receptacle 22 mounted in the shell or cable housing 18.

The container or can 16 may be of metal but is not limited to that material; it includes suitable means 24 for attaching it to cable 25. The container includes an open side 26 conveniently referred to as a top, receiving the plug of the connector. The container also includes means or stop means 28 of a suitable kind, such as struck-in or displaced elements providing top surfaces for engagement by an element of the connector plug.

The connector itself, as indicated above, may be of conventional construction, having for example a surrounding flange or bead 30 which engages stop elements 28, and a female connector portion 32 extending out through the open side or top of the container, and having the usual contact elements directed in that direction.

The container or can 16 is provided with ears or lugs 34 forming latching elements, positioned at the open side of the container and on opposite ends thereof, for cooperation with latching elements of the shell or cable housing 18.

The shell or cable housing 18 is an integral or one-piece article, preferably of molded plastic material. For convenience, it may be referred to as having a top or main body portion 36, which with end elements form an arch, and with a side-opening notch 38 preferably at the midpoint of the arch. The shell is also open at one or both sides 39 and 41 of the arch with preferably one of the open sides including the open end of notch 38 for insertion of a cable. The closed end of the notch is an upstanding collar element or half-collar 40 which may have a reenforcing bead or flange 42. The collar element may be generally circular and extends approximately half of a complete circumference, the notch 38 conveniently diverging outwardly for facilitating placing a cable 43 therein. The cable is so placed in position by merely fitting it in the notch 38 sideways into engagement with the collar element 40, and securing it therein by fastening means illustrated by a cable tie 44 preferably of plastic, having a band portion 46 which incircles the cable and the collar element and held in tied position by suitable securing means 48. The connector receptacle 22 is, of course, detachably held in the shell, and the cable can be secured to the connector receptacle when out of the mounting means and thereafter the connector receptacle and cable put into position by merely moving the components in sideways direction into the notch as referred to above. It is not necessary for the cable to be put into position linearly as by inserting the end of it through a hole. The securement of the cable in the notch by the tie, provides a strain relief as between the cable and the connector part.

The shell 18 may have a reenforcing flange 50 preferably only on one side, and longitudinally directed end elements 52, themselves having longitudinally directed extensions 54 as mounting ears for mounting in a panel opening (not shown). The shell has what may for convenience be termed a lower open side.

Extending downwardly from the elements 52 are vertical end pieces 56 each having a closed end, transverse slot 58 which serves as a detachable locking means for receptacle 22. Preferably strain relief slots 59 are provided. Extending longitudinally inwardly from the lower edges of the end pieces 56 are horizontal elements 60 forming grooves or spaces 62 between themselves and the longitudinal extensions 52, longitudi-

nally inline with the slots 58, for receiving end elements 64 of the plug receptacle 22 as referred to again hereinbelow. Notches 65 are provided for strain relief in flexing the latching elements 66 as referred to again hereinbelow. When shell 18 with plug receptacle 22 is panel mounted, retention of extensions 54 also serves to restrict outward movement of slots 58.

The shell 18 also includes latching elements 66 at the ends and extending downwardly, being for example immediately connected with the horizontal elements 60. The latching elements 66 and the horizontal elements 60 both extend transversely the full width of the shell. The latching elements 66 are flexible, each having a main, thin, or bladelike portion 68, a latching or locking shoulder 70, and a camming surface 72. For convenience, the lower side of the shell will be referred to as an open side, and the shell is applied or assembled to the container 16 by moving it downwardly with the open sides interfacing and the latching elements 66 engaging the latching elements 34 on the container and then snap into latching or locking position. The latching elements 66 may be manually flexed outwardly for releasing them from the latching elements 34 for removing the shell from the container. Preferably both of the latching elements 66 are flexible but if only one should be flexible, the shell can be latched and unlatched satisfactorily.

The connector receptacle 22 which as indicated above may be of conventional construction, at least in most part, has a male element 74 (FIG. 4) received in the female element 32. The receptacle also includes a surrounding bead or flange 76, the end elements 64 of which (FIGS. 1 and 3) extend into the spaces 78 in the shell, and into the slots 58. The engagement between this flange and the shell prevents relative sideways movement or displacement between the connector receptacle and the shell and more particularly it secures the shell itself against relative sideways displacement relative to the container 16, in view of the interengagement between the connector parts, which the shell is applied to or assembled with the container.

The male portion 74 extends generally through the open side of the shell and has contact elements engageable with the contact elements in the female portion 32 of the connector plug 20. The receptacle 22 has the usual elements 80 for securement thereto of the conductors of the cable. The connector receptacle being generally conventional in construction, as referred to above, may have slight modification in the flange 76 to cooperate with the spaces 78 and slots 58 in the shell.

The shell being of integral construction is very inexpensive, particularly in the fabrication steps thereof, i.e., molding, and it is efficient in its use in the mounting means, facilitating securement of the cable to the connector when out of the mounting means, and thereafter easily applying the cable and the corresponding connector part in the shell, with the further advantage that the shell can be easily applied to the container by a simple snap-on movement. The shell can be easily detached from the container by simply flexing outwardly one or both of the latching elements 66. The locking mechanism between the shell and the container, i.e., the latching elements 66, 34, is extremely simple, eliminating various devices heretofore known which were relatively complicated and correspondingly expensive.

The shell and container are connected or assembled by direct movement toward each other. The connector parts are so positioned relative to the open sides of the shell/container that the shell and container are spaced apart at their open sides. The connector parts are thus disposed so that in that movement, attention is given to interengaging the connector parts without particular regard to whether the shell and container are to be connected. The connector parts perform a guiding operation in putting the components together.

There are no physical connections between the shell and the container restraining them against relative transverse movement, the interengagement of the connector parts providing this restraint.

The shell surrounds what might be termed as "interior" in which the connector receptacle is disposed, and when the cable is positioned and clamped in the notch, its extended end is adjacent the connector part.

The arch formation of the shell, providing a full transverse opening therethrough, adds to the simplicity of the shell, and corresponding low expense of manufacture thereof.

The shell is provided with notches 59 at the ends to provide strain relief as between the elements 56, 52, in response to flexing of the latching elements 66.

We claim:

1. In connector and mounting means, the combination comprising,
 - a connector including a pair of mating parts each having a plurality of contact elements,
 - a container having an open side and latching elements on opposite ends adjacent the open side,
 - a shell having an open side and latching elements on opposite ends adjacent the open side,
 - the parts of the connector being mounted respectively in the container and shell with their contact elements adjacent the open sides and directed outwardly therefrom, at least one of the connector parts extending from the respective shell/container through the open side thereof a sufficient distance that when the connector parts are mated, the shell and container are free of interconnection such as would prevent their relative displacement transversely,
 - the container and shell being movable to assembled position by moving them together with their open sides interfacing, the connector parts being mated and the latching elements being interlocked in such movement, each of said connector parts and the respective shell or container having interconnection preventing relative transverse movement therebetween, and the connector parts, when mated, preventing relative transverse movement between themselves and thereby between the shell and container.

2. The combination of claim 1 wherein the latch elements on the container extend generally longitudinally outwardly, and the latching elements on the shell extend generally in the direction of the movement of the container and shell in assembling direction, and the latching elements yield in longitudinally outward direction in response to engagement with the latching elements on the container.

3. The combination of claim 2 wherein the latching elements on the shell are manually flexible in the direction stated, enabling manual release of the shell from the container from latched position.

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4. The combination of claim 1 wherein the shell has a side-opening notch for receiving a cable and positioned so that when the cable is so received therein, the end of the cable is disposed adjacent the connector part in the shell.

5. The combination of claim 4 wherein the connector part in the shell is detachably mounted therein, and the connector part and the adjacent portion of a cable connected thereto together can be removed as a unit from the shell without removing the cable from the connector part, the cable being removed out of the shell through the open side of the notch.

6. The combination of claim 4 wherein the notch has a closed end and a half-collar extending from the notch, the combination also including a tie for surrounding the half-collar and a cable in the notch and engaging the half-collar for retaining the cable in the notch.

7. The combination of claim 5 wherein the notch has a closed end and the shell has a half-collar at the closed end of the notch, and the shell, including the latching elements thereon and the half-collar, is a unitary article of molded plastic material.

8. A shell for use in mounting an electrical connector comprising
a single integral article of molded plastic material, the shell being in the form generally of an arch having a top main body portion and end elements extending downwardly therefrom,
the shell having a lower open side at the extremities of the end elements, and a transverse opening through the arch,
the main body portion having a side-opening notch and a half-collar extending upwardly from the closed end of the notch,
the shell also having end portions extending longitudinally outwardly from said end elements and terminal elements extending downwardly from the outer ends of said end portions and having transverse slots therein,
the shell further having lower elements extending longitudinally inwardly from the ends spaced downwardly from said end portions forming spaces between themselves and said end portions, longitudinally aligned with said slots, and
the shell additionally including latching elements extending downwardly from said lower elements,

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having thin elongated portions providing flexibility, and locking shoulders and camming surfaces at the extended ends thereof.

9. A shell for use in mounting an electrical connector having opposite ends and mounting means on said ends, comprising

a single integral article of molded plastic material including an arch having a top main body and downwardly extending end elements with an open lower side and sides transverse to said open side between said end elements, at least one of said transverse sides having an opening to permit side mounting of said connector and said body including a side-opening notch contiguous with said opening for receiving one end of an electrical cable, said notch having a closed end cooperative with a fastening means for holding said cable in a predetermined position,

lower elements extending longitudinally below said end elements and integral therewith to form spaces open on said one transverse side to receive said mounting means of said connector when said connector is inserted through said opening, said end and lower elements around said spaces including outwardly flexible locking means for detachably locking said connector in said shell, and latching elements extending downwardly from said lower elements and including thin elongated portions and lower ends with locking shoulders and camming surfaces.

10. A shell according to claim 9 wherein said body and end elements include a reinforcing flange limiting outward flexing of said end elements.

11. A shell according to claim 9 wherein said body includes a half collar facing said one transverse side.

12. A shell according to claim 11 wherein said side elements include outer end pieces with slots facing longitudinally inwardly for receiving said end mounting means of said connector.

13. A shell according to claim 12 wherein said arch has an opening extending between said transverse sides.

14. A shell according to claim 13 wherein said side elements include outward longitudinal extensions for mounting said shell with said connector in a panel.

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