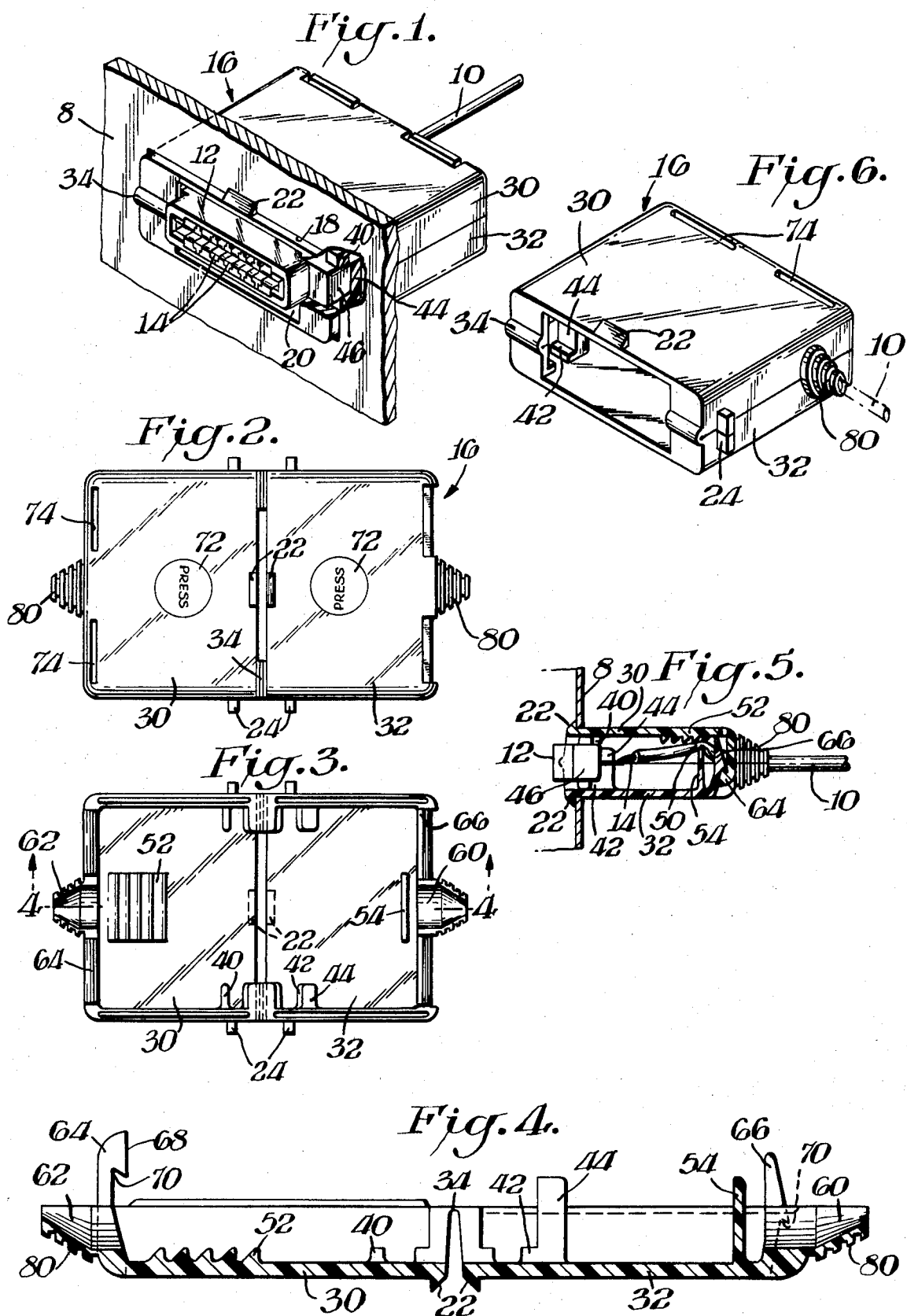




CONNECTOR HOUSING

BACKGROUND OF THE INVENTION

This invention relates to an improved connector assembly for electrical devices and, more particularly, to an improved housing for a cable connector.

Electronic components and subcomponents are used extensively in various kinds of radio equipment, electronic computers and other devices. These components are assembled together in a housing on a board (a circuit board) to form amplifiers, logic elements or the like. Thus assembled, they constitute an independent unit or module to be inserted as a replaceable package in a more complex system. Whatever the form, the housing or board components are electrically connected to prongs or fingers which are adapted to be plugged into a receptacle or connector.

In conventional usage, pluggable receptacles or connectors are mounted in a rack within the cabinet of an instrument or in a connector housing which is attached to the cabinet. Printed strips on the circuit board engage the resilient contacts of a female connector to complete an electrical connection. The connector provides mechanical support for the board.

Various housings have been designed for these connectors. One such housing is described and claimed in a copending application Ser. No. 586,451, filed Oct. 13, 1966 by Douglas E. Ritchie and now U.S. Pat. No. 3,432,802. The Ritchie connector is formed using only extruded and molded parts and hence is less expensive and easier to assemble than many other connector housings on the market. Even so, the Ritchie connector does require the use of two screws and hence requires some labor to assemble the connector in the housing.

It is an object of this invention to provide an improved housing for cable and connector assemblies.

Another object of this invention is to provide an improved connector housing which is relatively simple and is inexpensive.

A further object of this invention is to provide an improved connector housing which is unitary in construction.

BRIEF DESCRIPTION OF THE INVENTION

A unitary housing for positioning and enclosing a cable and electrical connector is formed of mating top and bottom shells or members integrally connected together at one edge by a hinge means which permits the top and bottom members to pivot about the hinge between open and closed positions. The edge in which the hinge is formed is broken to define an opening by complementary portions in the respective members. In addition the members have complementary strain relief means for gripping the cable when the members are in a closed position.

BRIEF DESCRIPTION OF THE DRAWINGS

The novel features that are considered characteristic of this invention are set forth with particularity in the appended claims. The invention, itself, however, both as to its organization and method of operation, as well as additional objects and advantages thereof, will best be understood from the following description when read in connection with the accompanying drawings, in which:

FIG. 1 is a pictorial view of the housing for a connector and cable in which the housing is illustrated as being mounted in the wall of an instrument cabinet;

FIG. 2 is a top plan view of the integral housing in an open position;

FIG. 3 is a bottom plan view of the housing shown in an open position showing the interior of the members;

FIG. 4 is a cross-sectional view of the two members in an open position taken through the section line 4-4 of FIG. 3;

FIG. 5 is a cross-sectional view of the housing with the two members in a closed position; and

FIG. 6 is a pictorial view of an alternative embodiment of the housing of this invention shown in a closed position and having a side opening to facilitate the cable.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In FIG. 1 there is shown a pictorial view of the housing of this invention mounted in a wall 8 of the instrument cabinet with which the connector housing is to be used. The housing of the invention encloses a cable 10 containing electrical wires and, in this instance, what is illustrated as an edge board connector 12. Such a connector is adapted to receive the prongs of a printed circuit or other component bearing board. The printed circuit board (not shown) has an edge portion with printed circuit lines terminating in such a manner as to make contact with the electrical contacts 14 of the edge board connector 12. One suitable edge board connector that may be used, by way of example, is described in U.S. Pat. No. 3,131,017 issued Apr. 28, 1964 to Martin A. Mittler. The tails of the resilient contacts 14 of the edge board connector 12 are connected, as by soldering (FIG. 5), to the respective conductors of the cable 10. The connector 12 has a stepped portion at either end to form mounting flanges 46.

In accordance with this invention, the edge board connector 12 is mounted in a unitary plastic housing 16 which housing is snapped into an opening 18 in the wall 8 of the instrument cabinet. From the exterior, the housing 16 is generally rectangular with an opening 20 in one sidewall which accommodates or permits access to the edge board connector 12. Small retaining tabs 22 are formed on the exterior top and bottom portions of the housing 16 to maintain the housing 16 within the opening 18. These retaining tabs 22 cooperate with another set of side tabs 24 to lock the housing within the opening 18. The front or outside edge of the retaining tabs 22 is sloped to facilitate the insertion of the housing 16 into the opening 18.

The housing 16 is formed from a unitary piece of material as may be most clearly seen in FIGS. 2, 3, 4 and 6. The housing is made up of top and bottom members 30 and 32, respectively, which are integrally connected together by a hinge means 34 at one edge. Each of the top and bottom members 30 and 32 are in the general form of a hollow rectangle or shell open at one face and joined together at the edges as illustrated. The housing may be formed of a single piece of flexible plastic material such as polyamid sold under the trademark "Nylon," polytetrafluoroethylene sold under the trademark "Teflon" or most preferably polypropylene plastic.

The top member or shell 30 and the bottom member or shell 32 each have complementary protuberances (FIG. 5) 40 and 42 which are adapted to engage either of the side tabs or ears 46 of the connector 12 and a stud 44 which engages the back portion of the connector tabs 12 such that it is locked into place. The front edge of the tabs 46 of the connector engage the hinge means 34 as seen most clearly in FIG. 1. Thus the connector 12 is locked against movement in any direction when the connection is closed.

The hinge means is the same material of which the top and bottom members 30 and 32 are formed. To form the hinges the material joining the two members is merely molded or fabricated as seen in FIG. 4 to have a very relatively thin dimension as seen at 34 (FIG. 4) such that the plastic, which is stiffly flexible, can flex. A hinge of this type is capable of lasting over an extended period of time and usage without the material fatiguing and breaking. The sidewall of each member 30, 32 is cut such that the hinge 34 is in two parts. These cuts define an orifice through which the connector 12 extends. The orifice preferably has a height greater than the thickness of the connector 12 so that the sidewalls of the housing may be depressed to disengage the locking tabs 22 from the wall orifice 18 in panel 8.

A cable strain relieving means is provided to relieve strain of the cable 10 upon the connector terminals 14. This strain relieving means includes complementary protuberances 52, 54 in the respective top and bottom members 30 and 32 which engage the cable as seen in FIG. 5 at the portion designated by the numeral 50. These protuberances include knurled, serrations 52 in the upper member 30 and a vertical planar member 54 formed in the center of the lower member 32 and posi-

tioned perpendicularly thereto. Thus when the members are in a closed position these protuberances 52 and 54 tightly engage the cable 10 at point 50 (FIG. 5) pinching it between the two such that if the cable is inadvertently pulled it does not become dislodged or exert a strain upon the terminals 14 of the connector 12.

Immediately rearward (FIG. 5) of the cable relieving means 50 mating hollow semicylindrical protuberances 60 and 62 are formed in both of the members 30 and 32 which together provide an orifice in the backside wall of the housing for the cable 10. The protuberances are tapered to a decreasing diameter so that to accommodate different diameter cables, one need only cut off a sufficient portion of the protuberances. Finally, the back edges of the two members 30 and 32 are provided with a latching means which includes mating latching members 64 and 66. The lower member 32 latching member 66 has a wedgelike cross section with a stepped portion 70 to permit it to slide easily against the mating surface 68 of the upper latching member 64. The upper latching member 64 also has a stepped portion 70 such that when the two members are completely closed, latching members 64 and 66 lock. The locking is accomplished by the stepped or notched portions 70 on each of the latching members 64 and 66 which notched portions interlock with each other. The latching members 64 and 66 are resilient so little difficulty is encountered in achieving a secure latch. To open the members, one merely needs to slide a thin instrument such as a screwdriver in between the latching members and pry to disengage the notched portions 70.

In the use of this connector housing, the flanged ends 46 of connector 12 are introduced into the rectangular receptacles formed by the protuberances 42 and 44 and the upper member 30 closed thereon so that the protuberances 40 engage the flanged ends 46. The cable 10 is positioned within the cable orifice 60-62 prior to closure. When the housing is closed, the latching members 64 and 66 interlock and the housing is ready for use. The housing may then be snapped into position within the opening 19 in the sidewall 8 by directly pushing the housing directly into the opening. To remove the housing one presses at the center portions of the top and bottom members 30 and 32 at the portions 72 designated "press" such that the retaining members 22 disengage and the housing may be withdrawn.

To facilitate the unlatching of the housing, slots 74 may be formed in the top member 30 such that a thin tool such as a screwdriver may be inserted through the slots to disengage the latch. In the alternative embodiment of FIG. 6 the cable protuberance 80 may be placed in the side of the housing instead of

at the rear portion as illustrated in FIGS. 1 through 5. The remainder of the construction is substantially the same as the embodiment just described except that the cable strain relief protuberances are relocated slightly to intersect the cable as it enters the housing through the protuberance 80.

The housing is seen to be simple, inexpensive and adaptable to many usages and many different types of connectors. The entire housing is simply molded into a unitary structure hinged to permit the two halves to be snapped together. The hinge is in effect a "living" hinge formed by flexing the material which the housing is formed of.

It will be obvious that various modifications may be made in the apparatus and in the manner of operating it. It is intended to cover such modifications and changes as would occur to those skilled in the art, as far as the following claims permit and as far as consistent with the state of the prior art.

We claim:

1. A housing for positioning and enclosing a connector and cable adapted to be electrically connected to said connector, comprising:

first and second shell-like members each having sidewalls; hinge means for integrally connecting one sidewall of each of said members together along a single edge for pivotal movement of said members at said edge between open and closed positions;

said members having complementary protuberances engaging said connector for locking said connector in position adjacent to said hinge means when said members are in a closed position;

said hinge means and the connected sidewalls being partially cut away to define an opening permitting access to said connector through said hinge means; and

said members having complementary strain relief means for gripping said cable when said members are in a closed position.

2. An apparatus according to claim 1 wherein each of said members have mating latching members adapted to engage for securing said members in a closed position.

3. An apparatus according to claim 1 wherein said members when closed define a passageway for said cable.

4. An apparatus according to claim 1 wherein the exterior of each of said members has protuberances adapted to engage and mount said housing in a wall orifice.

5. An apparatus according to claim 1 wherein said housing is formed of plastic and said hinge means is formed of a thin flexible portion of said plastic joining said first and second members.