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ELECTRICAL CONNECTOR ADAPTER

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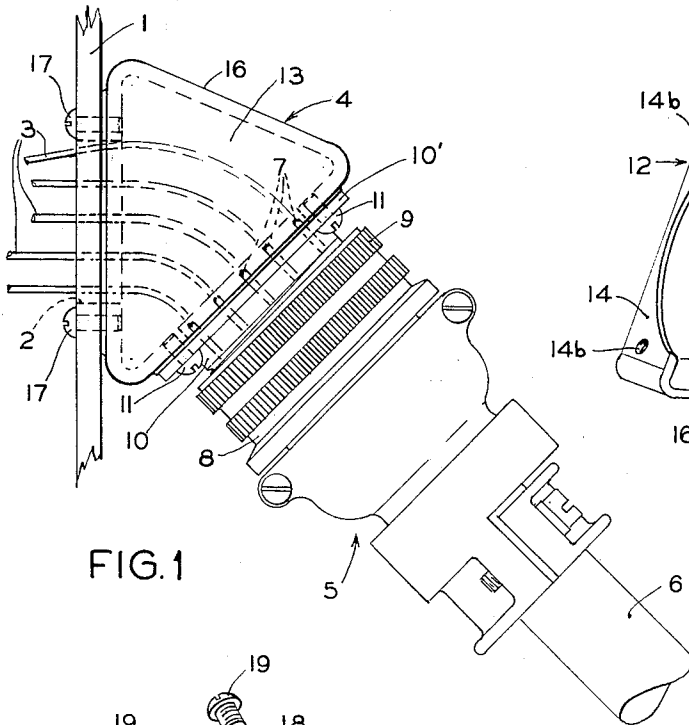


FIG. 1

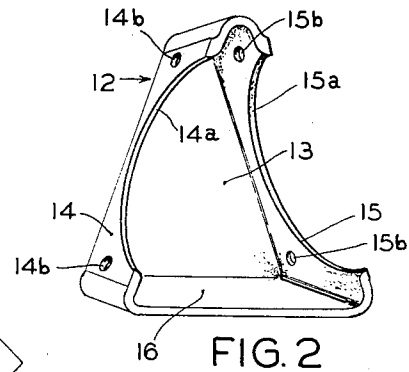


FIG. 2

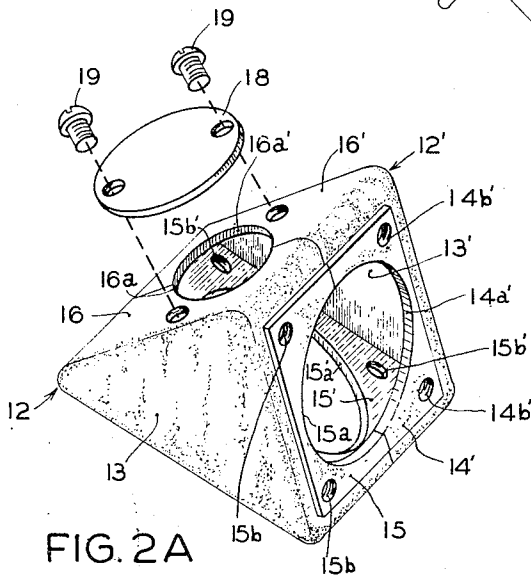


FIG. 2A

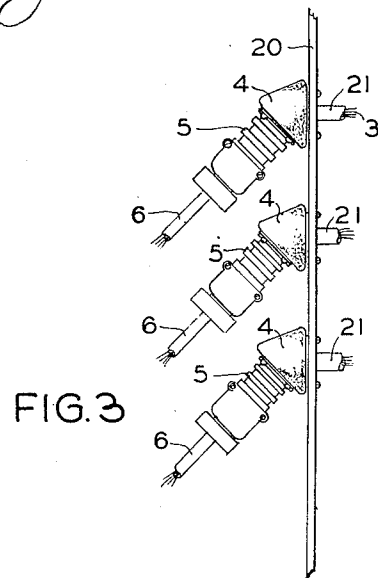


FIG. 3

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ELECTRICAL CONNECTOR ADAPTER

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5 Claims. (Cl. 285—189)

This invention relates to adapters for electrical connectors for providing a so-called elbow-type or angle casing between one or a group of panel-mounted electrical conductors and the connector associated therewith.

A well-known arrangement for leading off vertical-panel wiring comprises a standard pipe-fitting type of adapter, one end of which is secured to a side of the panel in alignment with an opening in the panel. The adapter is provided at its other end with a coupling flange for attachment to an electrical connector, such as a conventional connector of the plug and socket type known by the certification mark AN. A group of wiring from the other side of the panel is led through the panel opening into the adapter for connection to the connector, from which, generally in the form of a cable, the wiring extends to other equipment. This type of adapter, which is in quite general use, has a number of disadvantages including limited and restricted accessibility where a number of closely grouped cables are led from one side of a panel, poor space factor and complications in installing, inspecting or replacing the cable conductors. Furthermore, the conventional pipe fitting adapter has a 90° bend which often subjects the conductors to high bending stresses.

A principal object of this invention therefore is to provide an improved electrical connector adapter that is compact in design for maximum utilization of the space factor of the panel, while maintaining a high degree of accessibility for operation and maintenance of the connector and associated parts.

A further object of the invention is to provide an improved and simplified connector adapter for leading off panel wiring with gradual, rather than abrupt, change in direction such as through an angle of about 45°, and that is simple and inexpensive in construction and composed of a pair of easily fabricated interchangeable parts.

The invention will be more fully set forth in the following description referring to the accompanying drawing, and the features of novelty will be pointed out with particularity in the claims annexed to and forming a part of this specification.

Referring to the drawing,

Fig. 1 is a side view of the connector adapter constituting the present invention installed on a vertical panel and used with an AN type connector;

Fig. 2 is a perspective view of an interchangeable half-portion of the adapter casing;

Fig. 2A is a perspective view of a slightly modified form of the adapter casing embodying the invention, and

Fig. 3 is a side view of a vertical panel installation using the present invention for a multiple cable arrangement.

The installation illustrated in Fig. 1 comprises a vertical panel 1 having an opening 2 for leading a group of electrical conductors, such as indicated at 3, through the panel and the adapter 4, the connector 5 and outgoing cable 6. In installations of this type the conductors 3 from apparatus on one side of the panel are electrically connected as by soldering, to fixed terminals 7 of the con-

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necting terminals are secured as a unit to the adapter which is mounted at the other side of the panel. The contacting movable or disconnectable group of connector contacts (not shown) are suitably mounted in the detachable part 8 of the connector. The fixed and movable connector contacts are held securely in the connected position by means of an internally threaded collar 9 that is mounted on the detachable part 8 of the connector and is adapted to engage the correspondingly threaded sleeve 10 in which the fixed contacts are mounted. This sleeve is provided with a mounting flange 10' that is secured by the screws 11 to the adapter 4. The connector 5 herein illustrated and described is a conventional well-known AN type connector and further description thereof is considered superfluous other than to mention that the outgoing cable conductors may be electrically disconnected from the panel conductors by unscrewing the sleeve 9 and unplugging the contacts.

The connector adapter 4 as shown, comprises an angular casing composed of two similar interchangeable parts, one of which is shown in Fig. 2. In practice, these parts can be made from the same die or mold. Specifically, these two parts when placed together form a prism-like casing, Fig. 2A, the transverse cross-section of which defines an isosceles triangle as clearly shown by Fig. 1. The casing parts are composed of a suitable material having adequate structural strength and in case where a ground circuit is required through the adapter, a metal such as an aluminum alloy or the like, is used.

Referring to Fig. 2, each half-casing such as 12 comprises a triangular base portion 13 generally in the shape of an isosceles triangle, and three sidewalls 14, 15 and 16 extending from the base. The sidewalls are joined by rounded edges as illustrated for permitting easy fabrication of the casing by a molding operation. The sidewalls 14 and 15 have semi-circular cut-out portions 14a and 15a respectively which form with the complementary portions of the other half-casing circular openings for leading the electrical conductors through the adapter. These sidewalls also have plane surfaces, Fig. 2A, for joining to corresponding surfaces of the panel and connector in substantially flush relation thereto. The side 16 is rectangular in shape in the present instance. The sides 14 and 15 are also provided with threaded screw holes 14b and 15b respectively for securing the adapter to the connector and to the supporting panel.

As shown in Fig. 1 the adapter is secured at one side of the prism-like casing to the panel 1 by means of screws 17 and at the opposite side of the casing to the connector flange 10' by means of screws 11. These two sides of the adapter casing which make an acute angle with respect to each other, preferably an angle of 45° for insuring maximum compactness, convenience and accessibility for the outgoing cable, have the circular openings above referred to for leading the electrical conductors from the panel and through the adapter to the fixed part of the connector.

The complementary relationship of the adapter casing parts is best shown in Fig. 2A which also illustrates a slight modification for further increasing the functional efficiency of the adapter. In this modification the sidewalls 16 of the casing halves 12 and 12' are cut away as shown at 16a and 16a' so as to form when fitted together a circular opening for permitting ready inspection of the conductors and associated terminals without disassembly of the main adapter and connector structure. A cover plate 18 may be mounted over the opening by means of screws 19 for sealing the adapter against dirt, etc.

It will be noted that the drill centers for the fastening screws at the panel, the two attaching sides of the adapter and the connector flange 10' are identical, thereby providing complete interchangeability. For example in cer-

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tain cases, it may be desirable to insert the adapter between the panel and a connector that is secured directly to the panel. In such cases it is possible by reason of the split construction of the adapter to mount it in position as shown in Fig. 1 without disturbing the wiring to the connector. Also the adapter can be removed without disturbing the wiring.

It will therefore be seen that the connector adapter involving the present invention is not only extremely simple in design and construction but also can be fabricated at minimum expense and with minimum amount of material. This simplicity adds to rather than detracts from the efficiency of the adapter as will be readily apparent from an inspection of Fig. 3 which illustrates the invention as applied to a multiple cable installation on a vertical panel. The panel 20 in this instance has the incoming cables 21 grouped in comparatively closely spaced vertical alignment. With such spacing, the conventional 90° pipe fitting type of adapter would obviously result in such crowding of the connectors and cables that uncoupling and disconnecting the connectors would be extremely difficult if not impracticable. However, it will be seen that the present 45° adapter occupying minimum space provides ample accessibility to the connectors for ready disconnection, etc., and in addition provides an easy and gradual change in direction for the cable conductors thereby avoiding high bending stresses. The space factor of the panel is thereby not only greatly improved but at the same time there is provided improved appearance of the installation and greater ease of operation and maintenance.

It should be understood that this invention is not limited to specific details of construction and arrangement thereof herein illustrated, and that changes and modifications may occur to one skilled in the art without departing from the spirit of the invention.

What is claimed is:

1. An electrical connector adapter for leading to a connector and outgoing cable disposed at one side of a supporting distribution panel electrical conductors extending from the opposite side of said panel and arranged to be disposed between said panel and connector, said adapter comprising a casing generally in the shape of a triangular prism composed of two split sections and having first and second side walls forming an acute angle with one another, each of said side walls being split into two complementary sections, said first side wall arranged to face said first-named panel side and having an opening formed of complementary cut-away portions located at the edges of abutting portions of its split sections, said opening arranged to receive electrical conductors from the panel, each section of the first side wall being adapted to be secured to said panel independently of the other, said second side wall arranged to face said connector and also having an opening formed by complementary cut-away portions located at the edges of abutting portions of its split sections, said last-named opening arranged to lead the conductors to the connector, each section of said second side wall being adapted to be mounted to said connector independently of the other.

2. An electrical connector adapter for leading to a connector and outgoing cable disposed at one side of a supporting distribution panel conductors which extend from the other side of said panel and arranged to be disposed between said panel and connector, said adapter comprising a casing generally in the shape of a triangular prism composed of two split sections and having first and second planar side walls forming an acute angle with one another, each of said side walls being split into two complementary sections, said first side wall arranged to face said first-named panel side and having an opening formed of complementary cut-away portions located at the edges of abutting portions of its split sections, said opening arranged to receive conductors from said panel, each section of said first side wall being adapted to be secured to the confront-

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ing side of said panel in flush relation thereto, said second side wall arranged to face said connector and also having an opening formed by complementary cut-away portions located at the edges of abutting portions of its split sections, said last-named opening arranged to lead the conductors to said connector, each section of said second side wall being adapted to be secured to the confronting side of the connector in flush relation thereto.

3. An electrical connector adapter for leading to a connector and outgoing cable disposed at one side of a supporting distribution panel conductors which extend from the other side of said panel and arranged to be disposed between said panel and connector, said adapter comprising a casing generally in the shape of an isosceles triangular right prism composed of two similar interchangeable half-sections split apart along a right sectional plane symmetrically with respect thereto, said casing having first and second planar side walls defining the equal sides of the isosceles triangle which sides form an angle of approximately 45°, each of said sidewalls being split into two similar half-sections by said splitting plane, said first side wall arranged to face said first-named panel side and having a circular opening formed by complementary semi-circular cut-away portions located at the edges of abutting portions of its half-sections, said opening serving to receive conductors from said panel, each section of said first side wall being adapted to be secured independently to the other to the confronting side of said panel in flush relation thereto, and said second side wall arranged to face said connector also having a similar circular opening formed of semi-circular complementary cut-away portions located at the edges of abutting portions of its half-sections, said last-named opening serving to lead the conductors to said connector, the sections of said second side wall being adapted to be secured independently of the other, to the confronting side of said connector in flush relation thereto.

4. An electrical connector adapter for leading to a connector and outgoing cable disposed at one side of a distribution panel conductors which extend from the other side of said panel and arranged to be disposed between said panel and connector, said adapter comprising a casing generally in the shape of a triangular prism composed of two split sections, said casing having first and second side walls forming an acute angle with one another, each of said sidewalls being split into two complementary sections, said first side wall arranged to face said panel and having a major opening formed by complementary cut-away portions located at the edges of abutting portions of its split sections, said opening arranged to receive conductors from said panel, said second side wall arranged to face said connector and having a major opening formed by complementary cut-away portions located at the edges of abutting portions of its split sections, said last-named opening arranged to lead the conductors to said connector, each section of said first side wall having at least one minor aperture located symmetrically with respect to a corresponding minor aperture in the other section, said minor apertures arranged to receive means for mounting the sections of said first side wall on said panel independently of one another, and each of the sections of said second side wall having at least one minor aperture located symmetrically with respect to a corresponding minor aperture in the other section, said last-named minor apertures arranged to receive means for mounting the sections of said second side wall on said connector independently of one another.

5. An article of manufacture for use as an interchangeable half-part of a connector adapter of the type that is mounted on a distribution panel to a connector in turn mounted on the adapter, comprising a triangular base portion in the form of an isosceles triangle, flange-like side wall portions joined to each other and extending from the peripheral edges of said base portion in a direction perpendicular thereto so as to form with said

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base portion an integral structure, the two wall portions extending from the equal edges of the base portion each having cut-away portions at the outer edges thereof semi-circular in form and arranged symmetrically with respect to each other, the semi-circular cut-away portions being complementary to the corresponding cut-away portions of a similar adapter half-part so as to form, when said half-parts are united, apertures for receiving and leading conductors to the connector.

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