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J. TYMKEWICZ

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PANEL-MOUNTED ELECTRICAL CONNECTOR

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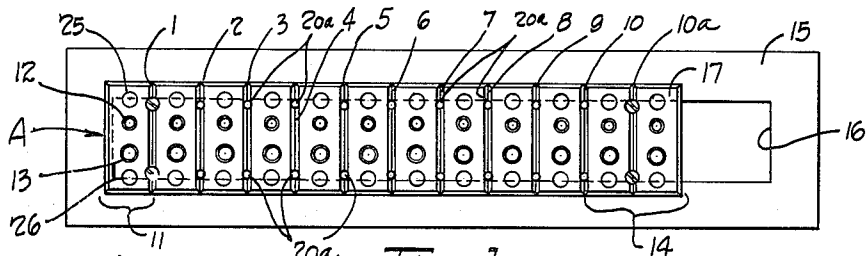


FIG. 1

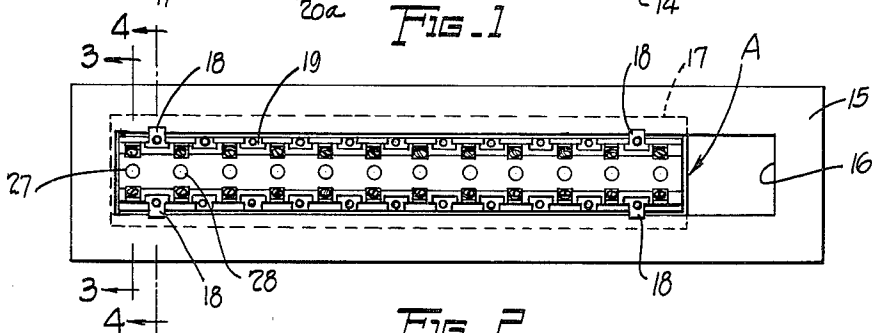


FIG. 2

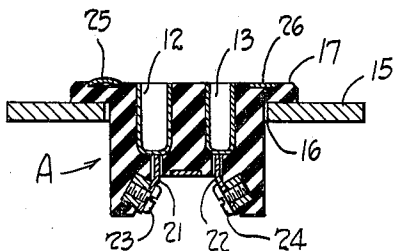


FIG. 3

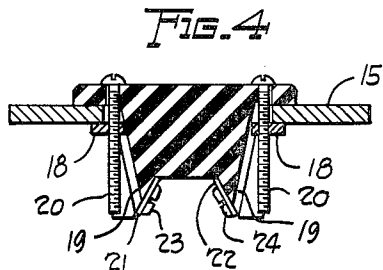


FIG. 4

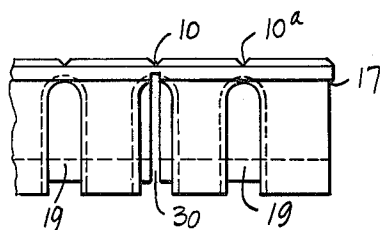


FIG. 5

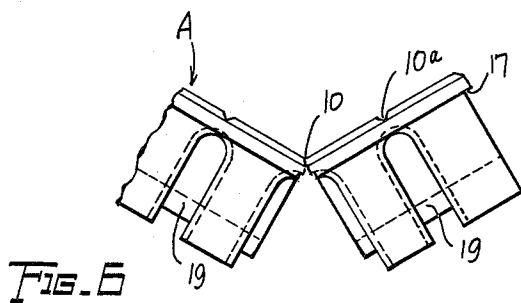


FIG. 6

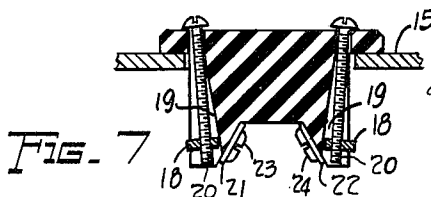


FIG. 7

INVENTOR.

John Tymkewicz
BY Robert Robb
Attorneys.

1

3,046,516

PANEL-MOUNTED ELECTRICAL CONNECTOR

John Tymkewicz, 20200 Parkview Ave.,

Rocky River 16, Ohio

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The present invention relates to electrical connector means and, more particularly, to electrical connector devices and mounting means therefor in which any desired number of electrical connector units may be readily assembled with the mounting means in detachable relation thereto.

The principal object of the invention is to provide such electrical connector means including an electrical connector device comprising a plurality of individual separable connector units fabricated as a single unitary structure.

Another principal object of the invention is to provide such an electrical connector device which may be readily associated in detachable relation to suitable mounting means and wherein such connector device is separable into a plurality of individual connector units which are capable of being readily individually associated with such mounting means in detachable relation thereto.

Another object of the invention is to provide such electrical connector means having novel means for securing the same in connected relation with the mounting means.

Another principal object of the invention is to provide an electrical connector device having self contained securing means enabling the device to be detachably secured to a mounting panel without screws and without mutilation of such panel, and enabling such securement by insertion of a portion of such connector device through an opening in such panel from the front without requiring any manipulation from the rear of the panel for the purposes of such securement.

A further object of the invention is to provide such electrical connector device provided with novel securing means capable of securing either the multiple unit device as a whole or individual separable connector units thereof to the mounting means in detachable relation thereto.

Another object of the invention is to provide such electrical connector device in which the individual connector units are separable one from another in a novel manner.

Still another object of the invention is to provide electrical connector means wherein electrical connector devices consisting of separable connector units enables any desired number of electrical circuits to be provided on a given control panel in such manner that the number of circuits provided may be increased or decreased or rearranged as desired without mutilation of the control panel.

In carrying my invention into practice I provide an electrical connector device comprising an integral body molded of suitable insulating material and designed to provide a plurality of separable individual connector units which are fabricated as a single unitary structure. The electrical connector device is provided with securing means whereby the device as a whole may be inserted in a suitable opening in a control panel and detachably secured thereto or individual connector units of such connector device may be separated therefrom and individually inserted in such standardized opening in the control panel and individually detachably secured thereto.

Other objects, advantages and features of the invention will become apparent from the following detailed description taken in conjunction with the accompanying drawing in which:

FIGURE 1 is a front elevational view of an electrical connector panel embodying the invention.

2

FIGURE 2 is a rear elevational view of the same.

FIGURE 3 is a sectional view taken on the line 3—3 of FIGURE 2.

FIGURE 4 is a sectional view taken on the line 4—4 of FIGURE 2.

FIGURE 5 is a fragmentary side elevational view of the electrical connector device of FIGURE 1 separated from the mounting panel and showing one of the individual connector units partially severed from the main body of the device and ready to be broken away therefrom.

FIGURE 6 is a view similar to FIGURE 5 but showing the severed connector unit being broken away along the score line.

FIGURE 7 is a view similar to FIGURE 4 but showing the clamping means in retracted position.

Now referring to the drawing and describing the invention in detail, the electrical connector device generally designated by the letter A comprises an integral body molded of suitable electrical insulating material such as Bakelite or hard rubber. The front surface of the body of the device A is provided with a plurality of score grooves designated by the numerals 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 and 10a which serve to delineate individual connector units such as that designated by the numeral 11 (bracketed in FIGURE 1). Each of the individual connector units is provided with a pair of female receptacles 12 and 13 for receiving the contact prongs of a male electrical plug not shown. The individual connector units 11 are formed as integral portions of the single unitary body of the multiple connector unit device designated A, the said individual connector units 11 being separable from the main body of the device A in the manner to be hereinafter described.

Adjacent pairs of the connector units 11 comprise what may be termed a double connector unit as indicated by the numeral 14 (bracketed in FIGURE 1). The double connector units 14 are separable, as such units, from the main body of the device A in the manner hereinafter described.

In FIGURES 1 and 2, the connector device A comprising a plurality of the separable connector units 14 and 11 is shown on a panel or board 15 provided with an opening 16 therethrough through which a portion of the body of the device A may be inserted as shown best in FIGURES 3 and 4. The body of the device A is provided with a peripheral flange portion 17 which engages the outer face of the panel 15 when a portion of the body is inserted through the opening 16 as described. A novel securing means is provided for detachably securing the connector device A to the 15. As shown, this securing means comprises clamping instrumentalities including the T-shaped clamping nut members 18 which are arranged for sliding movement in the correspondingly T-shaped tapered or inclined guideways 19 a plurality of which are provided on opposite sides of the body of the device A. These guideways 19 are arranged in alignment with the score grooves 1 to 10a inclusive and thus each double connector unit such as 14 is provided with a pair of such guideways 19 one at each of opposite sides of the device A. Assuming the plane of the drawing sheet and likewise the plane of the panel 15 to be horizontal, when the device A is mounted thereon, the guideways 19 incline inwardly and downwardly from the flange portion 17.

Each of the clamping nut members 18 has threaded cooperation with a respective clamping bolt 20 provided on the body of the device A extending through openings 20a through the score grooves 1 to 10a inclusive and approximately in longitudinal alignment with the respective guideways 19. The clamping bolts 20 may be provided with heads having respective screw driver slots therein for effecting rotation thereof which will in turn cause

movement of the clamping nut members 18 along the inclined guideways 19. When the clamping bolts have been rotated so that the clamping nuts 18 are at the extreme ends of the threaded portions of the bolts 20 and disposed in retracted position at the inner ends of the guideways 19 as shown by FIGURE 7, the body of the device A may under such conditions be inserted through the opening 16 of the panel 15 so that the clamping nut members 18 will be disposed rearwardly of the latter whereupon the clamping bolts 20 may be rotated to draw up the clamping nuts 18 to the condition illustrated in FIGURE 4 wherein the said clamping nut members are in clamping engagement with the rear face of the panel 15.

The receptacles 12 and 13 will each be provided with a suitable tubular metallic liner which will have close fitting frictional engagement with the respective contact prong of the plug to be inserted therein. Metallic contact members 21 and 22 are provided having electrical contact respectively with the metallic liners in the receptacles 12 and 13 and contact screws 23 and 24 are respectively provided for each of the contact members 21 and 22 for effecting connection of the wires of electrical conduit thereto.

The electrical connector means of the invention is suitable for use for connecting thermocouple devices into various circuits as desired, such thermocouple devices having a plug provided with a pair of contact prongs which will be inserted into the receptacles 12 and 13 of a particular connector unit 11 of the device A. For the purpose of use with thermocouples of the bi-metallic type the respective liners of the receptacles 12 and 13 may be of different alloys corresponding to the respective ones associated with the prongs of the plug of such thermocouple to be inserted in the receptacles 12 and 13 of the particular connector unit 11. The utility of the electrical connector means of the invention is of course not limited to this application in conjunction with thermocouples.

The electrical control means of the invention affords considerable flexibility in the arrangement of the connector devices A or separable units thereof in conjunction with a mounting means such as the panel 15 and also facilitates the mounting and rearrangement of such devices or units thereof with respect to such panel. Thus the connector devices A of my invention are preferably provided initially in units comprising an even number of the double connector units such as 14. It has been found expedient to provide the devices A in units consisting of twelve of the individual connector units 11 which will provide six double connector units 14 as and if desired. Each of the single units 11 provides connections for one circuit and suitable indicia may be provided on each unit 11 to designate the respective terminals of such circuits. Thus identification discs 25 and 26 are provided on the front face of the device A to designate respectively the receptacles 12 and 13 of each connector unit 11. Similarly identification discs are provided on the rear face of the device A whereby, for example, identification disc 27 may be provided with suitable indicia indicating that the terminals 23 and 24 of that unit 11 pertain to a particular designated circuit and identification disc 28 may indicate that terminals 23 and 24 of the next adjacent unit 11 pertain to another particular designated circuit.

The identification discs 25, 26, 27 and 28 provided with suitable indicia may be of circular concavo-convex configuration of a size to just fit into respective cylindrical recesses in the body of the material of the device A and because of their concavo-convex configuration when pressed into such recesses they will spread outwardly against the walls thereof and thus be retained therein to prevent unauthorized displacement therefrom.

Preferably the mounting panels 15 for use in conjunction with my invention will be provided with one or more

openings 16 of a length to receive a given number of connector units 11 and as many of the devices A or units thereof as are required will be mounted on such panel. For example if twelve or more circuits are required, a device A consisting of twelve units 11 could be mounted as a single unit on the panel and for this purpose it would be necessary to provide clamping means for each set of guideways provided in the body of the device A but it would only be necessary to provide two or three sets of such clamping means for each such device A or portion thereof so mounted on the panel, each such set of clamping means including a pair of the clamping nut members 18 and a corresponding pair of the clamping bolts 20. Thus provision for any desired number of circuits on a particular mounting panel may be made by severing from the main body of the device A a section thereof comprising a double unit 14 or any larger section thereof including two or more units 11. Each such section so severed from the main body of the device A will be capable of being clamped to the mounting panel 15 in the manner previously indicated by providing such section with one or more sets of the clamping nuts 18 and clamping bolts 20, since each such section comprising a double unit 14 or more than two units 11 will have at least one pair of the guideways 19 for utilization of the clamping means to secure said sections to the mounting panel 15.

FIGURES 5 and 6 illustrate the manner in which a section of the main body of the device A may be severed therefrom. The severance is accomplished by sawing through the body of the material of the device A from the rear side thereof in such a manner that the saw cut such as indicated at 30 in FIGURE 5 is aligned with one of the score grooves 1 to 10a. The saw cut need only extend partially through the flange portion 17 since, under such condition, the section to be severed may then be broken away from the main body along such score line in the manner indicated by FIGURE 6.

From the foregoing it will be seen that my invention facilitates the provision of electrical connector panels capable of accommodating any desired number of circuits, by providing standardized connector devices A comprising a plurality of individual separable connector units capable of being separated into sections provided with their own individual clamping means whereby as many of said connectors devices A or sections thereof as desired to accommodate the number of circuits required may be quickly and efficiently mounted upon a panel such as 15 in a manner permitting the ready addition to such panel, or rearrangement thereon, of such connector units as desired.

In FIGURE 3 identification disc 25 is shown in its initial concavo-convex condition as when first inserted into the circular recess in the body of the device A after which it will be flattened to the condition as shown by the disc 26 in FIGURE 3 to spread it against the walls of such recess for retaining therein.

It is notable that the provision of the self contained securing means on the device A or units thereof, said securing means including the clamping element above referred to, enables the mounting of the device A or units thereof on the mounting panel such as 15 without mutilating said panel in any way and without requiring the employment of screws to enter the panel. It is further notable that the provision of the novel self contained securing means enables the device A or units thereof to be mounted on the panel 15 in detachably secured relation thereto by insertion of the device A or units thereof into the opening 16 from the front side of the panel and not requiring any manipulation from the rear side of the panel in order to effect the securement.

I claim:

1. An electrical connector device of the class described, comprising an integral body providing a plurality of separable connector units fabricated as a single unitary structure, said body having a peripheral flange engageable

5

with one face of a mounting panel when a portion of said body is inserted through an opening through such panel, each of said units having a pair of T-shaped guide-ways at opposite sides of the body extending inwardly from said flange in converging directions, a respective correspondingly T-shaped clamping member disposed for sliding movement in each respective guide-way, and means for effecting movement of said clamping members lengthwise of said guide-ways from positions protruding from the body and clampingly engageable with the opposite face of such panel when the clamping members are adjacent said flange to positions retracted into said body when said clamping members are moved away from said flange, whereby to permit withdrawal of said device from such opening in such mounting panel.

2. An electrical connector device of the class described, comprising an integral body providing a plurality of separable connector units fabricated as a single unitary structure, said body having a peripheral flange engageable with one face of a mounting panel when a portion of said body is inserted through an opening through such panel, each of said units having a pair of T-shaped guide-ways at opposite sides of the body extending inwardly from said flange in converging directions, a respective correspondingly T-shaped clamping nut member disposed for sliding movement in each respective guide-way, and a clamping bolt member threadingly cooperable with each respective nut member and extending through said flange for operating manipulation outwardly thereof, whereby manipulative rotation of the bolt members will effect movement of said nut members lengthwise of said guide-ways from positions protruding from the body and clampingly engageable with the opposite face of such panel when the clamping members are adjacent said flange to a position retracted into said body when said clamping members are moved away from said flange, whereby to permit withdrawal of said device from such opening in such mounting panel.

3. An electrical connector device of the class described, comprising a body having a peripheral flange engageable with one face of a mounting panel when a portion of said body is inserted through an opening through such panel, said body having a pair of T-shaped guide-ways at opposite sides of the body extending inwardly from said flange in converging directions, a respective correspondingly T-shaped clamping member disposed for sliding movement

6

in each respective guideway, and means for effecting movement of said clamping members lengthwise of said guide-ways from positions protruding from the body and clampingly engageable with the opposite face of such panel when the clamping members are adjacent said flange to positions retracted into said body when said clamping members are moved away from said flange, whereby to permit withdrawal of said device from said opening in such mounting panel.

4. An electrical connector device of the class described, comprising a body having a peripheral flange engageable with one face of a mounting panel when a portion of said body is inserted through an opening through such panel, said body having a pair of T-shaped guide-ways at opposite sides of the body extending inwardly from said flange in converging directions, a respective correspondingly T-shaped clamping nut member disposed for sliding movement in each respective guide-way, and a clamping bolt member threadingly cooperable with each respective nut member and extending through said flange for operating manipulation outwardly thereof, whereby manipulative rotation of the bolt members will effect movement of said nut members lengthwise of said guide-ways from positions protruding from the body and clampingly engageable with the opposite face of such panel when the clamping members are adjacent said flange to a position retracted into said body when said clamping members are moved away from said flange, whereby to permit withdrawal of said device from such opening in such mounting panel.

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