

[54] ELECTRICAL CONNECTOR

[72] Inventor: Bruno Baumanis, River Forest, Ill.
[73] Assignee: Molex Incorporated, Downers Grove, Ill.
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Primary Examiner—Joseph H. McGlynn
Attorney—Olson, Trexler, Wolters & Bushnell

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[57] ABSTRACT

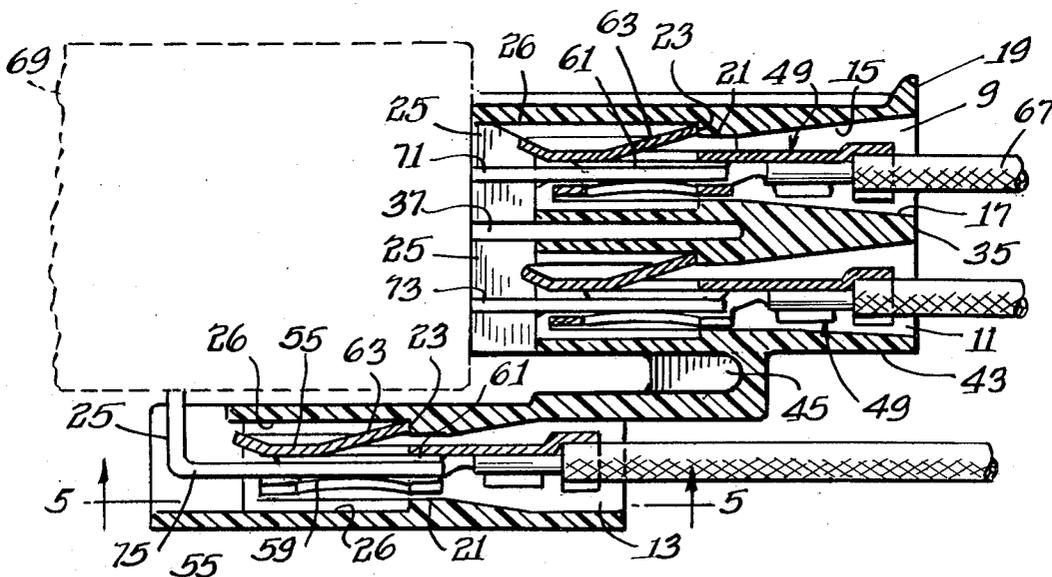
A connector has a dielectric body with hollow parallel body sections each containing a female terminal for receiving a male terminal of a switch. The body sections are joined together such that the body sections may be independently flexed where they are joined. This flexure permits variation in the spacing of the front end openings in the connector, thereby to accommodate in the connector switch terminals of varying spacing.

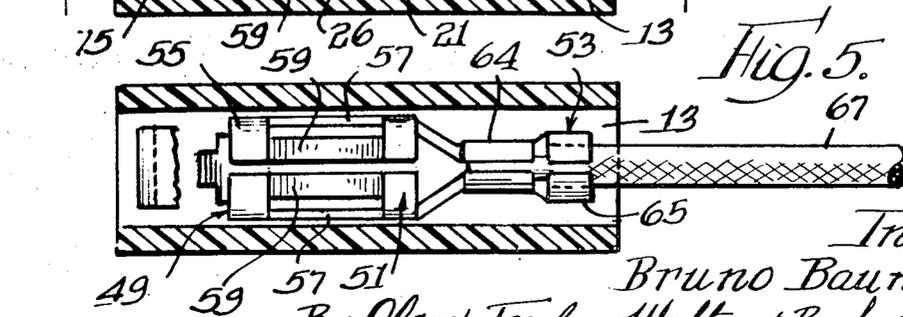
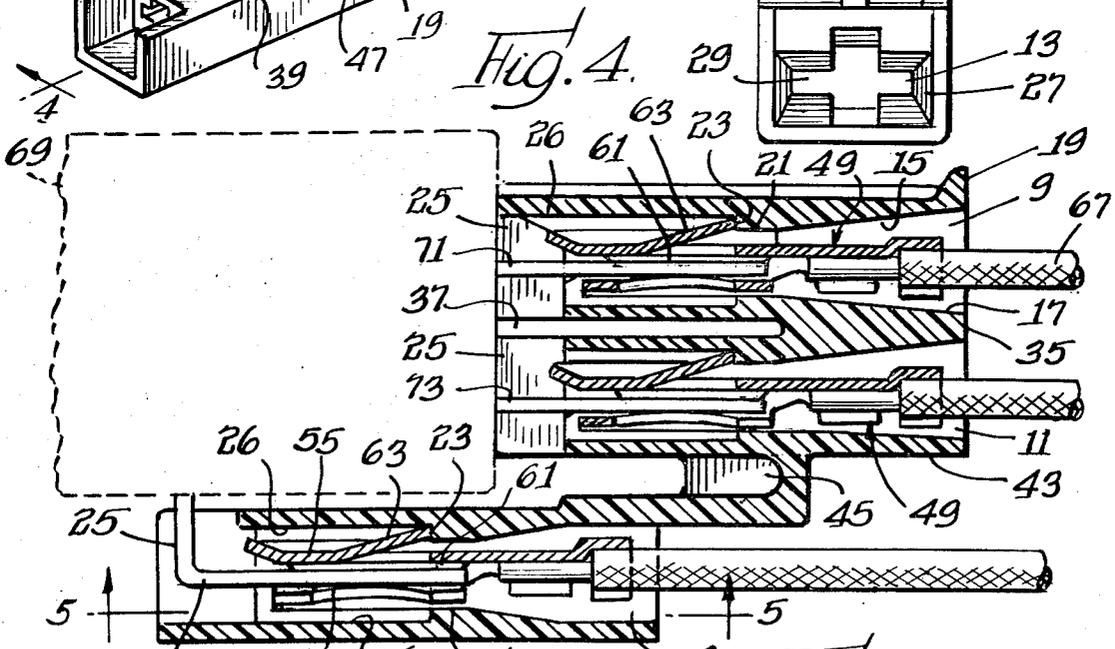
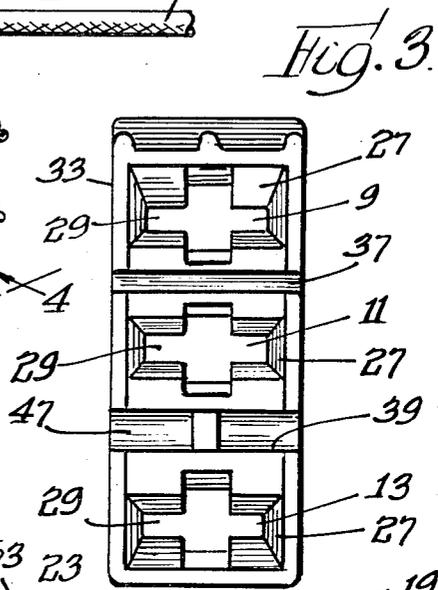
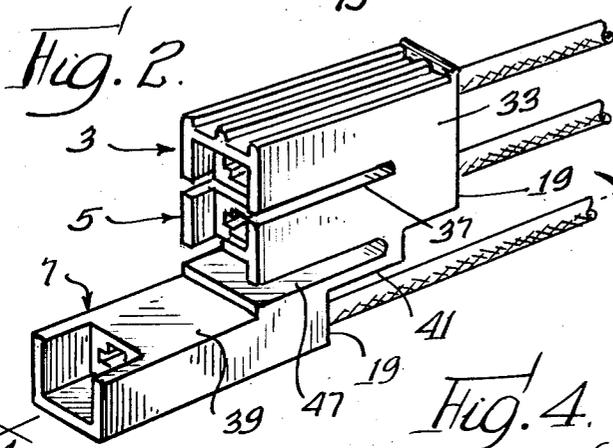
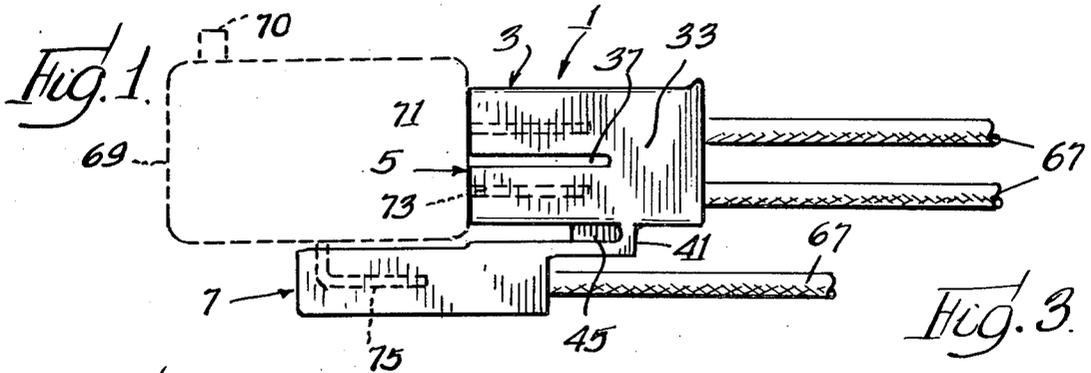
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6 Claims, 5 Drawing Figures





Inventor
Bruno Baumanis
By: Olson, Treple, Walters & Bushnell attys.

ELECTRICAL CONNECTOR

BACKGROUND OF THE INVENTION

This invention relates to electrical terminal blocks of the type that include a molded plastic connector with metallic terminals positioned therein.

There are a number of short travel switches commercially available which are commonly plugged into connectors or terminal block assemblies. Generally speaking, these switches include a plurality of male terminals, and in a typical case, namely that of a single pole double throw switch, there are three terminals projecting from the switch housing. The spacing of the switch terminals varies among switches of different manufacturers, and although the variation is not extreme, it has been found that it is sufficiently great to prevent there being a recognized standard spacing. As a result, a relatively rigid terminal block that is suitable for the switch of one manufacturer may be incompatible with the same type of switch of another manufacturer.

OBJECTS AND SUMMARY OF THE INVENTION

Accordingly, it is an object of this invention to provide a connector which is primarily intended for attachment to known types of short travel switches and which is capable of receiving the terminals of such switches despite variations, within reasonably expected limits, in the spacing of the switch terminals. While the primary purpose of the connector is for use with short-travel switches, it will be seen that the connector may be used for other purposes where connections are to be made with terminals of varying spacing.

It is another object of the present invention to provide a connector of the type stated which is a one piece construction and is relatively inexpensive to manufacture.

It is still another object of the present invention to provide a connector of the type stated that can accommodate known types of female terminals retentively therein.

In accordance with the above objects the connector of the present invention comprises a dielectric body with parallel hollow juxtaposed sections adapted to house female terminals for reception of the male terminals of the switch. The body sections are joined by a zone of body material such that the body sections are capable of a modicum of relative flexing at the body joining material and thereby vary the spacing of the entrance ends of the body sections to accommodate the switch terminals despite variations in the spacing thereof. This is in contrast with prior connectors in which the spacing of the entrance ends that receive the switch terminals is essentially fixed.

BRIEF DESCRIPTION OF THE FIGURES

In the drawing:

FIG. 1 is a side elevational view of a terminal block constructed in accordance with and embodying the present invention;

FIG. 2 is a perspective view thereof;

FIG. 3 is a front elevational view, on an enlarged scale, but omitting a showing of the female terminals within the connector;

FIG. 4 is a sectional view taken along line 4—4 of FIG. 2 and showing the connector assembled with a switch; and

FIG. 5 is a fragmentary sectional view taken along line 5—5 of FIG. 4.

DETAILED DESCRIPTION

Referring now in more detail to the drawing, there is shown a dielectric connector body 1 that is molded in one piece of a suitable resilient plastic material. The body 1 comprises a plurality of juxtaposed parallel body sections, in this instance three and generally designated at 3, 5, 7. The upper body sections 3, 5 are of equal length and are molded such that their corresponding ends are aligned while the lower body section 7 is longitudinally offset or displaced from the body sections 3, 5. Each of the sections 3, 5, 7 is of generally hollow rectilinear shape and includes longitudinal openings 9, 11, 13 extending therethrough. These openings are of similar configuration and so a description of any one of them will suffice for purposes of the present invention, it being understood that like reference numerals indicate like parts with respect to the other openings.

The opening 9 has top and bottom tapered wall sections 15, 17 extending from the rear end 19 of the body section 3 and terminating in short parallel stretches 21, 21. At the forward edges of the parallel stretches 21, 21 the opening 9 is contoured to provide transverse shoulders 23, 23, and extending from the shoulders to the entrance or front end 25 of the body section 3 are opposed parallel wall portions 26, 26. A short distance axially inwardly of the entrance end 25, each body section is formed with a transverse shoulder 27 which, as best seen in FIG. 3, provides a generally cruciform cross-section 29 for that region of the opening 9. Except at the cruciform portion 29, the sides of the opening 9 are parallel, being defined by sidewall surfaces 31, 31.

The body sections 3, 5 are joined together in the region of their rear ends 19 and over a region forwardly therefrom toward their entrance ends 25 by body material such that relative flexing of the body sections 3, 5 is permitted. For this purpose the body sections 3, 5 have common coplanar sidewall portions 33, 33 and a common boundary wall portion 35 (FIG. 4), the latter containing the tapers 17, 17 and separating the longitudinal openings 9, 11 of the respective body sections 3, 5. The resulting arrangement thus provides a slot 37 intermediate the body sections 3, 5 and running from their entrance ends 25 to the wall portion 35.

Since the lower body section 7 is longitudinally offset from the intermediate body section 5, the two are flexibly secured together in a somewhat different manner. Accordingly, the top wall 39 of the body section 9 integrally includes a tongue 41 which is, in effect, a thickened rear portion of the top wall 39. This tongue 41 projects rearwardly beyond the rear end 19 of the body section 7 and is turned upwardly at right angles for integral connection with the lower wall 43 of the body section 7 approximately in vertical alignment with the forward edge of the common wall portion 35. For reinforcement, the tongue 41 may include a central rib 45 joined to the lower wall 43. It will be seen, therefore, that the arrangement for hinged joining the body sec-

tions 5, 7 thus provides a slot 47 therebetween which allows the body sections space to move toward one another.

Within each of the respective openings 9, 11, 13 are female terminals 49, 49, 49 of like construction of known type. Suffice it to say, however, that the terminal 49 is a one piece sheet metal member comprising a leading end 51 and a trailing end 53. The leading end 51 is substantially a hollow open-ended rectangle with side walls 55, 55 and relatively narrower end walls 57, 57. As best seen in FIGS. 4 and 5, one of the sidewalls 55 is longitudinally split and cut away in the provision of two inwardly projecting, resilient, spaced apart contacts 59, 59. The opposite wall 55 is deformed to provide adjacent indentations 61 which are approximately aligned respectively with the contacts 59, 59. Thus, as viewed from FIG. 5, the indentations would be below the contacts 59, 59. Intermediate the indentations 61, 61 the upper wall 55 is provided with an outwardly struck tongue 63 that is resilient and is adapted to engage the shoulder 23. The tongue 63 is resilient so that when the terminal 49 is inserted into the opening 9, 11, 13, as the case may be, the tongue 63 will be depressed by engagement with the taper wall portion of the body section and will snap outwardly just as it passes the shoulder 23. This prevents retraction of the terminal from within the body section. The forward end shoulder 27 limits the axial advance or forward movement of the terminal into its associated opening 9, 11 or 13. The trailing end 53 integrally includes crimping arms 64, 65 for crimping lead wires 67, 67, 67 to the respective terminals such that the insulated lead wires project outwardly from the rear ends 19 of the several body sections 3, 5, 7.

A typical switch 69 having an actuating button 70 includes three flat terminals 71, 73, 75. In the arrangement shown, two of the terminals 71, 73 project from one side of the switch housing while the remaining terminal 75 projects downwardly from the switch body and is bent at a right angle so as to be parallel with the terminals 71, 73. In assembly with the connector, the switch terminals 71, 73, 75 engage and make electrical contact with the several terminals 49 as by a friction fit between each switch terminal and the contacts 59, 59 and indentations 61, 61 on the associated terminal 49. The spacing between the several switch terminals 71, 73, 75 is not uniform among the switches of various manufacturers and may vary to some degree. However, insertion of the switch terminals 71, 73, 75 within the terminals 49, 49, 49 is permitted since each of the body sections 3, 5, 7 is capable of a modicum of flexing from their normal or molded relative position.

The invention is claimed as follows:

1. An electrical connector comprising a flexible dielectric body having body sections, each body section having a longitudinal opening extending therethrough, the body sections being juxtaposed and each having means in its opening for retaining an electrically conductive terminal therein such that each terminal may be presented to an entrance end of the body for receiving from said entrance end an elongated terminal adapted for engagement with the first-mentioned terminal, said means including transverse shoulder means adjacent to the entrance end of the body section for limiting the insertion of the first-mentioned terminal

into the body section from the opposite end, said body sections being spaced apart along portions of their lengths and being integrally joined by body material along other portions of their lengths, a first portion of joining body material forming a common longitudinal wall portions between first and second adjacent body sections, said common wall portion longitudinally separating the openings of said first and second body sections, a second portion of joining body material comprising a tongue that connects a wall of a third body section to a wall of said second body section, said tongue being bent to project toward said wall of the second body section, said entrance ends of said first and second body sections being substantially aligned and said entrance ends of said second and third body sections being longitudinally offset, the joining body material portions constituting zones of flexure for adjacent body sections that operate to vary the spacing of their entrance ends for accommodation of elongated terminals of varying spacing.

2. A connector according to claim 1 in which the body sections are substantially parallel.

3. An electrical connector comprising a flexible dielectric body having parallel body sections each with a longitudinal opening and entrance and rear ends, two adjacent body sections having corresponding ends respectively juxtaposed and being joined by body material that constitutes a common longitudinal wall portion between the openings of said two body sections, said two body sections being spaced apart from said wall portions to provide a slot extending from said wall portion to one set of corresponding ends of the body sections, an additional body section having a longitudinal opening that extends from an entrance end to a rear end of said additional body section, said additional body section being longitudinally displaced from one of said body sections such that the entrance end of said one body section is longitudinally intermediate the entrance and rear ends of said additional body section, said additional body section being secured to said one body section by a tongue of body material that provides a slot between said additional body section and said one body section, said additional body section having a wall and said tongue projecting rearwardly of said wall and being bent to project toward said one body section for connection therewith, said slots permitting flexing of the body sections relative to one another at the joining regions of body material.

4. An electrical connector according to claim 3 in which said additional body section wall has a thickened portion at one end and said tongue projects from said thickened portion.

5. An electrical connector comprising a dielectric body having hollow juxtaposed body sections with entrance openings facing in the same direction, terminals in the body sections and presented to the respective openings for reception of companion terminals, and means formed by resilient connections of body material between the body sections for providing a modicum of flexing of the body sections to accommodate variations in the spacings of said companion terminals, one of said body sections having a tongue formed by an extension of a wall thereof, said extension being bent remote from said one body section to project toward and join a wall of an adjacent body section to form one of said resilient connections.

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6. A combination according to claim 5 in which the connector includes three parallel body sections, one of said body sections being longitudinally offset from the other two body sections.

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