

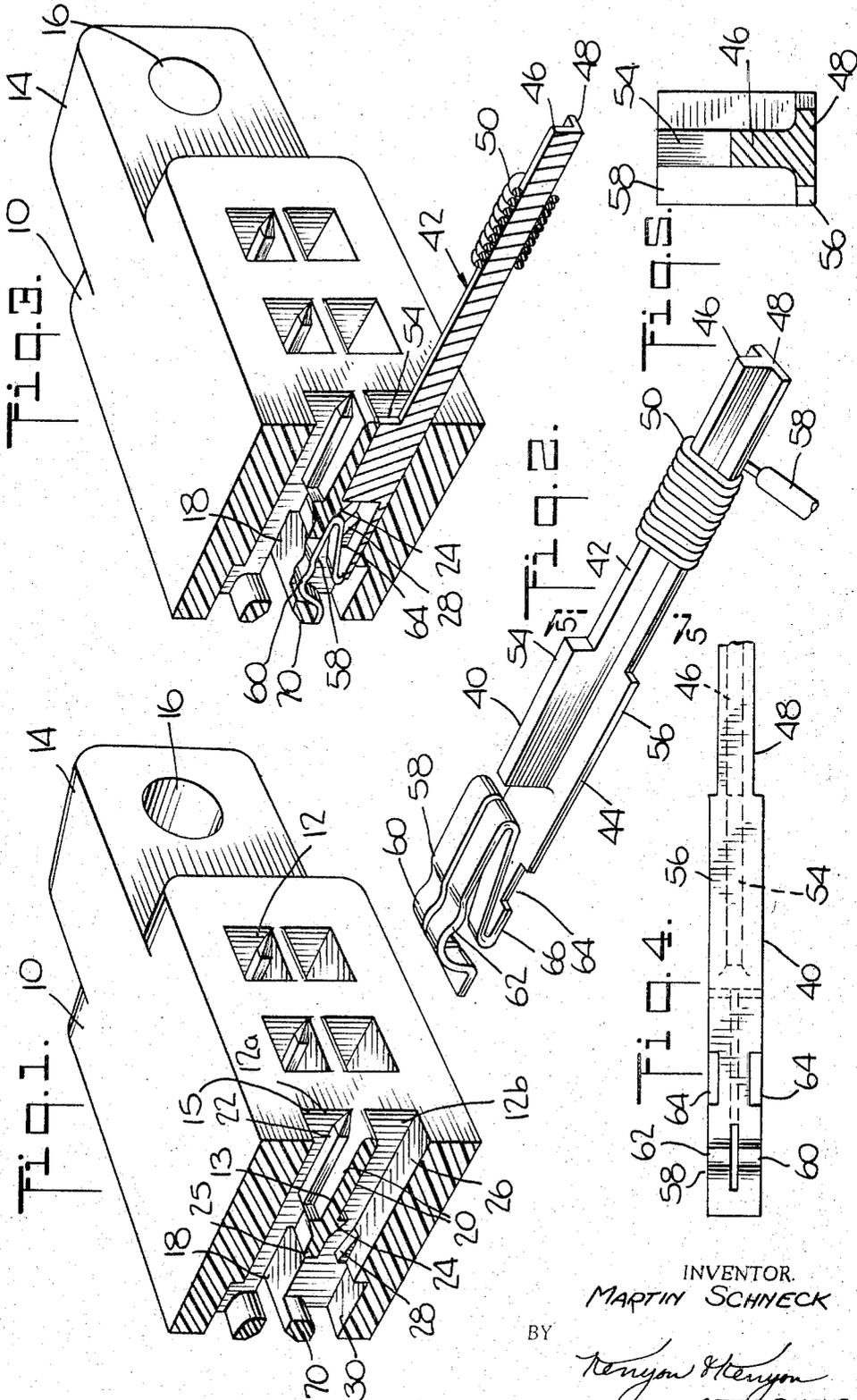
Nov. 7, 1967

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ELECTRICAL CONNECTOR WITH TERMINAL ELEMENTS
OF GENERALLY T-SHAPED CROSS SECTION

3,351,891

Filed Oct. 20, 1964

2 Sheets-Sheet 1



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FIG. 6.

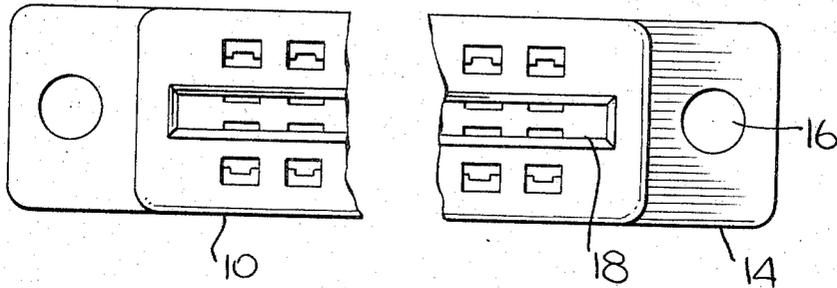


FIG. 7.

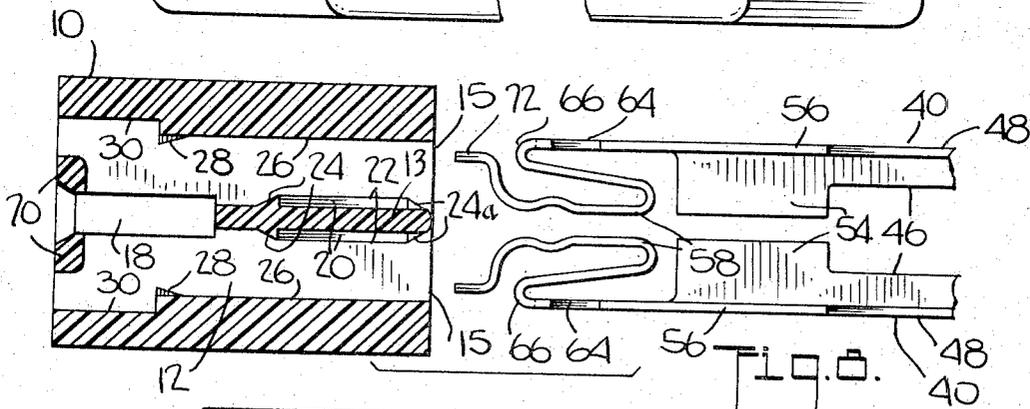
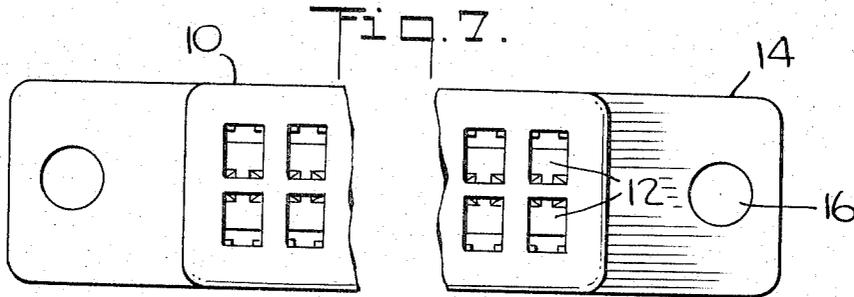


FIG. 8.

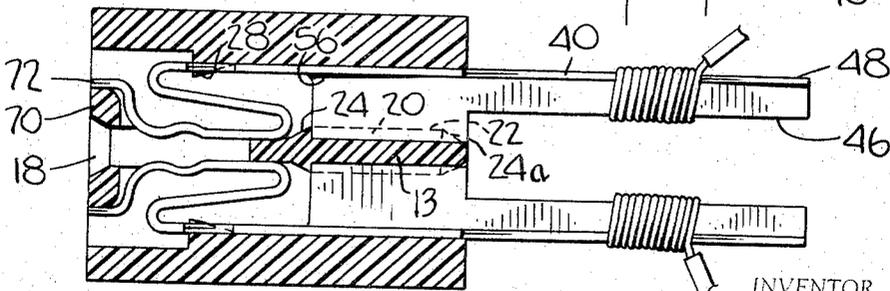


FIG. 9.

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ELECTRICAL CONNECTOR WITH TERMINAL ELEMENTS OF GENERALLY T-SHAPED CROSS SECTION

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This invention relates to a new and improved electrical connector and more particularly to a new and improved electrical connector utilizing novel terminal elements that are easily inserted into and removed from the housing of the connector.

In general, the electrical connector of the present invention comprises a connector housing and a plurality of terminal elements adapted to be inserted into the connector housing. The terminal elements are provided with a terminal segment of generally T-shaped cross section adapted to protrude externally of the housing when inserted therein. The terminal segment of generally T-shaped cross section provides for rigid support and easy termination of electrical conductors having wire ends to be wrapped around said segment. The portion of the terminal element to be inserted into the connector housing comprises a spring segment, preferably bifurcated, adapted to provide positive contact pressure and easy insertion of the element into the housing. Detents provided on the elements are adapted to mate with locking means within the housing to provide for positive locking action of the elements in the housing. The spring segment also allows for easy removal of individual elements from the housing when desired.

It is thus an object of this invention to provide an electrical connector which is easily assembled and which is low in cost and simple to manufacture.

It is a further object of the present invention to provide an electrical connector adapted to terminate any desired number of electrical conductors up to a predetermined number.

It is still another object of the present invention to provide an electrical connector for terminating one or more electrical conductors wherein terminal elements terminating individual conductors may be easily inserted into and removed from the connector housing.

It is yet another object of the present invention to provide an electrical connector for terminating one or more electrical conductors which provides rigid support for terminated conductors, improved contact action, and positive locking of terminal elements within the connector housing.

Other and further objects will be apparent from the following description and drawings wherein:

FIG. 1 is a partially sectional perspective view of the preferred embodiment of the connector housing of the present invention;

FIG. 2 is a perspective view of the preferred embodiment of a terminal element of the present invention;

FIG. 3 is a partially cross-sectional perspective view of the terminal element of FIG. 2 as inserted into the connector housing of FIG. 1;

FIG. 4 is a plan view of the terminal element of FIG. 2;

FIG. 5 is a transverse sectional view taken along lines 5-5 of FIG. 2;

FIG. 6 is a front partial elevational view of the connector housing of FIG. 1;

FIG. 7 is a rear partial elevational view of the connector housing of FIG. 1;

FIG. 8 is a partially sectional elevational view of two terminal elements prior to insertion into the connector housing; and

FIG. 9 is a partially sectional elevational view of the

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terminal elements and connector housing of FIG. 8 after insertion of the elements into the housing.

Referring now to the preferred embodiment of the present invention illustrated in the figures, FIG. 1 shows a partial perspective view of a connector housing 10 of insulating material such as Bakelite or the like. Housing 10 is provided with a plurality of channels 12 adapted to receive a plurality of terminal elements which are described in greater detail hereinafter. Housing 10 is further provided with a portion 14 with hole 16 through which a screw or the like may be inserted to secure connector housing 10 to another suitable connector, terminal board, etc. As shown more clearly in FIG. 8, channels 12 pass through the entire length of housing 10. Channels 12 are preferably paired in two rows running the breadth of housing 10. As shown in FIG. 6, a recess running substantially the breadth of the housing may be provided in the front portion of housing 10 and is of such a depth that all of the channels 12 open into it.

Referring to FIG. 1, channel 12 is shown in detail at 12a and 12b. As shown in sectional view, spacer wall 13 is provided between channels 12a and 12b. Spacer wall 13 is provided with grooves 20 having side shoulders 22, said grooves and side shoulders providing a portion of one wall respectively of channels 12a and 12b. Shoulders 22 are preferably bevelled as at 24a, in order to provide for easy insertion of a terminal element into an individual channel 12. Spacer wall 13 is further provided with ramp segments 24 and end segment 25. Channels 12a and 12b are shown opening out into recess 18, which, as hereinabove described, runs substantially the breadth of housing 10 such that all of the channels 12 open into it. Recess 18 is adapted to mate with the male portion of another connector or the like. It will be understood that other means may be provided to establish positive mating between housing 10 and other connectors in which case recess 18 would be unnecessary and spacer wall 13 could be provided to run the entire length of channels 12.

The wall of channel 12b opposite to spacer 13 is shown in FIG. 1 as having a surface portion 26 and a surface portion 30. Surface portion 26 is further provided with a pair of ramp-shaped detents 28 which are adapted to provide a positive locking with a terminal element inserted into channel 12b.

Referring now to FIGS. 2, 4, and 5, there is shown a preferred embodiment of a terminal element adapted to be inserted within channel 12 of housing 10. Terminal element 40 is comprised of a terminal segment 42 of generally T-shaped cross section which, when element 40 is inserted into housing 10, will be external of housing 10 and a segment 44 which is adapted to be inserted into channel 12 of housing 10 and locked therein. Terminal segment 42 is comprised of two mutually perpendicular members 46 and 48. An electrical conductor 50, having insulation 52 is shown wrapped around terminal segment 42. Since segment 40 is of electrically conductive material, such as metal, there is positive electrical contact between conductor 50 and terminal element 40. Segment 44 of element 40 is of generally T-shaped cross section and is provided with mutually perpendicular members 54 and 56 which are respectively integral with members 46 and 48 of terminal segment 42. Segment 44 of element 40 is provided with spring portion 58. Spring portion 58 is bifurcated and comprises segments 60 and 62 to provide for positive contact action. Element 40 is provided with notches 64 to provide positive locking of element 40 in housing 10. Notches 64 are adapted to mate with ramp detent 28 of channel 12. Since element 40 is adapted to be easily inserted into channel 12 of housing 10, the maximum width and height of element 40 are made sufficiently less than the width and height of channel 12 to allow for easy insertion.

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Referring now to FIG. 3, there is shown in sectional view terminal element 40 inserted into channel 12 of housing 10. Upon insertion of element 40 into channel 12b, for example, the lower surface of element 40 will slide smoothly along surface 26 until engagement with detent 28. Simultaneously, member 54 will be guided into groove 20 and the upper portion of spring portion 58 will contact shoulders 24 which will tend to compress spring portion 58. Further insertion of element 40 into channel 12 will force segment 66 of spring portion 58 upwardly over ramp detents 28 until notches 64 mate with detents 28. Inward movement of element 40 is arrested by the engagement of the leading edge of member 54 with ramp segment 24 of spacer 13. When element 40 has been inserted completely into channel 12 of housing 10, portion 58 of element 40 will abut against segment 70 of channel 12.

The positioning of elements 40 in channel 12 is more clearly shown in FIGS. 8 and 9, where a pair of elements 40 are shown before and after insertion into respective channels 12 of housing 10. As shown in FIG. 9, member 54 of element 40 fits securely into groove 20. Notches 64 are mated with detents 28 to provide a firm locking action and leading edge 72 of element 40 rests firmly on segment 70, thus providing support for spring portion 58 of element 40. Similarly, spring portion 58 partially rests on spacer 13 and partially extends into recess 18.

It will be understood that the terminal connector of the present invention may be made to have any desired number of terminals according to the number of electrical conductors to be terminated. Thus, in FIGS. 6 and 7, terminal housing 10 is shown in broken view as having only eight channels in order to indicate that housing 10 may be made to have any desired number of channels.

Although a specific form of element has been described and illustrated hereinabove, it will be understood that such element may take other forms within the scope of the present invention.

Thus, it will be seen that the terminal connector of the present invention provides many advantages over prior art electrical connectors. The T-shaped cross section of the terminal element external of the connector housing provides a rigid member for wrapping electrical conductors that is highly resistant to bending. Means are provided on the terminal element to allow easy insertion of the element into the connector housing. The novel bifurcated spring portion of the terminal element permits easy insertion of the element into the connector housing while providing positive locking action of the element within the housing and positive contact for external contacts inserted into the connector. Locking means are provided on the terminal element and within the connector housing to aid in locking the element within the housing.

It will be understood that any number of elements may be assembled with a suitable connector housing adapted to receive such elements. The novel construction of the terminal element of this invention allows for easy disassembly or removal of an individual terminal element without the necessity of disassembly of the entire connector. Similarly, the ease of insertion of an individual terminal element into the connector housing allows additional terminal elements to be added to the connector as the need develops, thus providing great flexibility and versatility.

Although only one embodiment of the novel electrical connector of the present invention has been described and illustrated hereinabove, other embodiments of the present invention will be readily apparent to those skilled in the art and this invention is not intended to be limited to the above description and illustrations, but rather by the following claims.

What is claimed is:

1. An electrical terminal for terminating one or more electrical conductors adapted to be inserted into an electrical connector housing comprising a terminal segment of

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generally T-shaped cross section at one end of said terminal adapted to extend externally of said connector housing for terminating one or more electrical conductors wound around said terminal segment, and a second segment integral with said terminal segment adapted to be inserted within said connector housing, said second segment having a spring portion at the other end of said terminal, said spring portion adapted to hold said electrical terminal within said connector housing and to provide positive contact pressure for an external contact to be inserted into said connector housing and engaged with said electrical terminal, said second segment further having a portion of generally T-shaped cross section intermediate said spring portion of said second segment and said terminal segment and integral with both said segments, said intermediate portion of said second segment adapted to be internal of said connector housing.

2. The electrical terminal of claim 1 wherein said second segment includes locking means for positively locking said terminal within said connector housing.

3. The electrical connector of claim 4 wherein said spring portion is bifurcated.

4. An electrical connector for terminating one or more electrical conductors comprising a housing, said housing having a plurality of channels, each of said channels extending the length of said terminal housing and having openings at opposite ends of said housing, a plurality of terminal elements, one of said plurality of terminal elements being inserted into each of said channels of said housing, each of said terminal elements having a terminal segment of generally T-shaped cross section at one end of each of said terminals extending externally of said housing, said terminal segment being adapted to terminate one or more electrical conductors, each of said terminal elements further having a second segment integral with said terminal segment, said second segment of each of said terminal elements further having a spring portion at the other end of said terminal elements, said spring portion having means locking each of said terminal elements within said housing and to provide positive contact pressure for an external contact inserted into said connector housing and engaged with said terminal element and wherein said second segment of each of said terminal elements includes a portion of generally T-shaped cross section intermediate said spring portion end of said second segment and said terminal segment and integral therewith, said intermediate portion of said second segment being disposed in said connector housing.

5. The electrical connector of claim 4 wherein said spring portion is bifurcated.

6. The electrical connector of claim 7 wherein said means locking each of said terminal elements within said housing includes detent means within said channel which engages a part of said spring portion.

7. An electrical connector for terminating one or more electrical conductors comprising a housing, said housing having a plurality of channels extending the length of said housing and having openings at opposite ends of said housing, said plurality of channels being arranged in parallel rows running substantially the breadth of said housing, each of said channels having a grooved surface extending from one end of said channel and running along a portion of the length of said channel, said housing having a recess at the end of said housing opposite to said grooved surface of said channels and running substantially the breadth of said housing, each of said channels opening into said recess along a portion of the length of said channels, each of said channels further having detent means therein and a plurality of terminal elements, each of said plurality of terminal elements being inserted into one of said plurality of channels of said housing, each of said terminal elements comprising a terminal segment of generally T-shaped cross section at one end thereof adapted to extend externally of said housing such that one or more electrical conduc-

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tors may be wound around said terminal segment, each of said terminal elements further having a second segment integral with said terminal segment and adapted to be internal of said housing, said second segment of each of said terminal elements comprising a spring portion at the other end of said element and a portion of generally T-shaped cross section intermediate said spring portion and said terminal segment and integral therewith, said spring portion being bifurcated in order to provide positive contact pressure for an external contact inserted into a channel of said connector housing and engaged with said terminal element, said intermediate portion of said second segment adapted to engage with said grooved surface of said channel and be held in position thereby, said second segment being further provided with locking means adapted to engage with said detent means within said channel such that each of said terminals is positively locked within said connector housing.

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