Sept. 22, 1970 J. T. GREGORY 3,530,424

MULTIPLE CONNECTOR

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Fig. 1

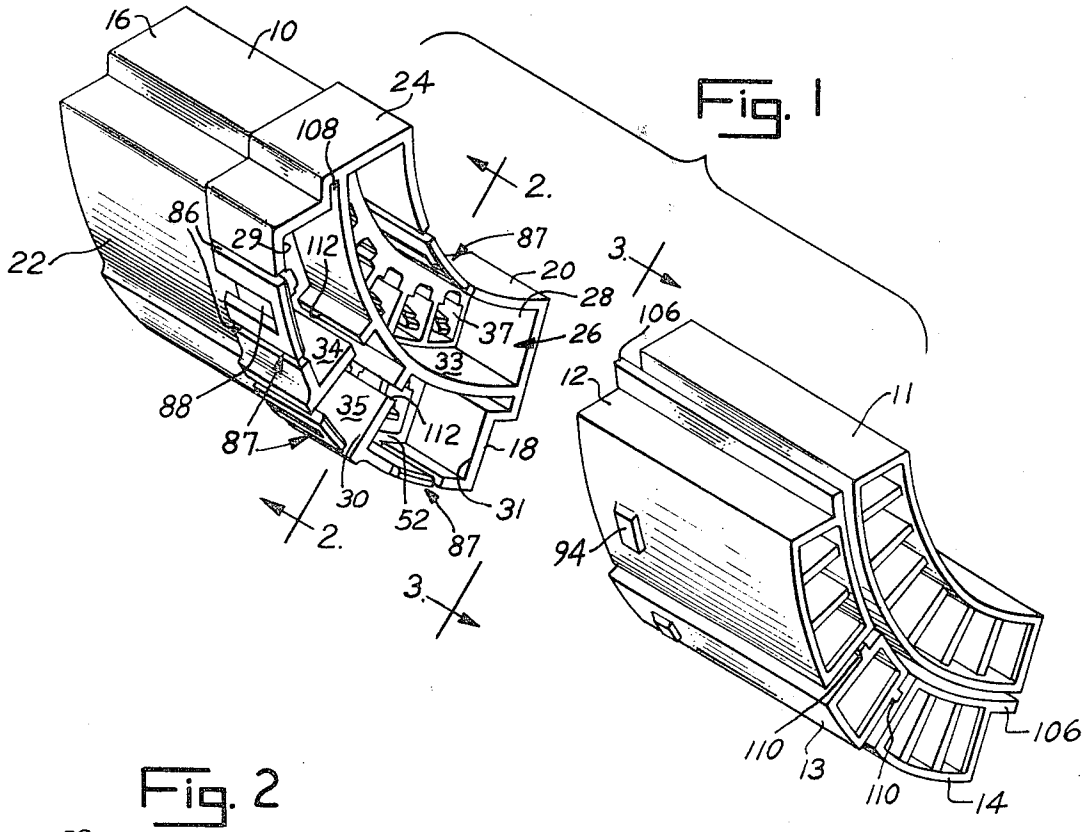


Fig. 2

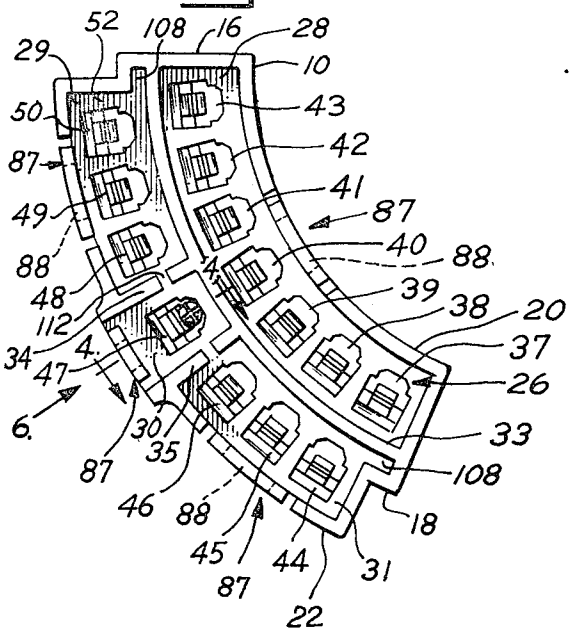
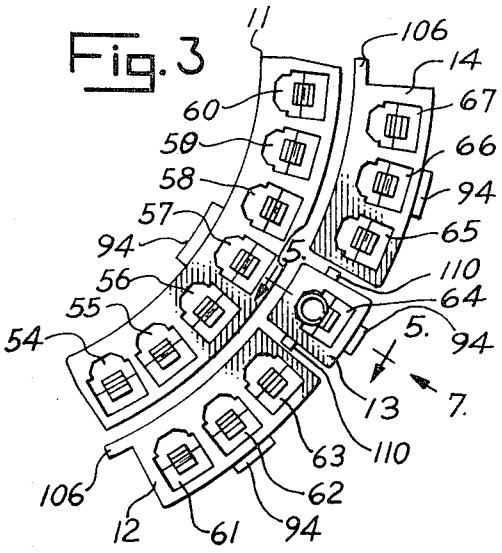


Fig. 3



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Fig. 4

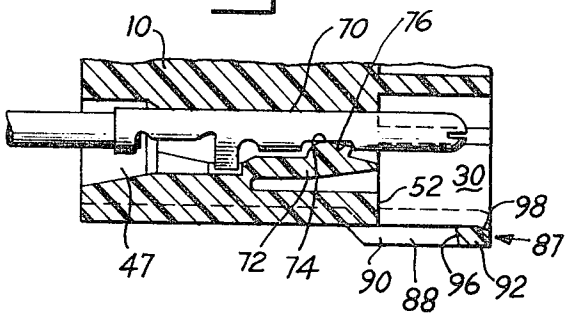


Fig. 5

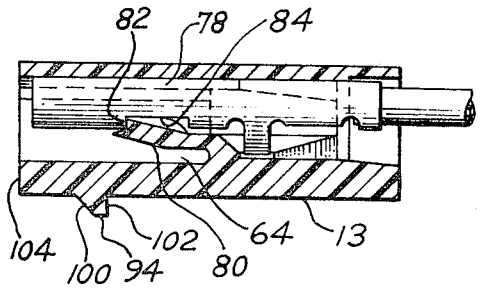


Fig. 6

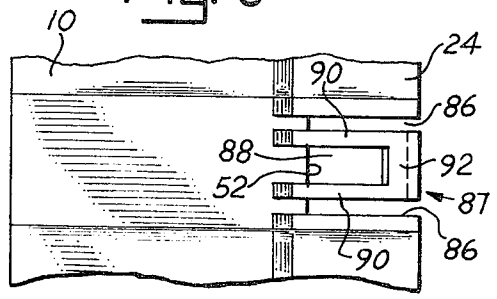


Fig. 7

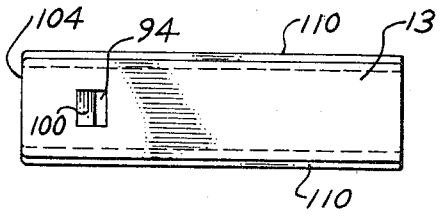
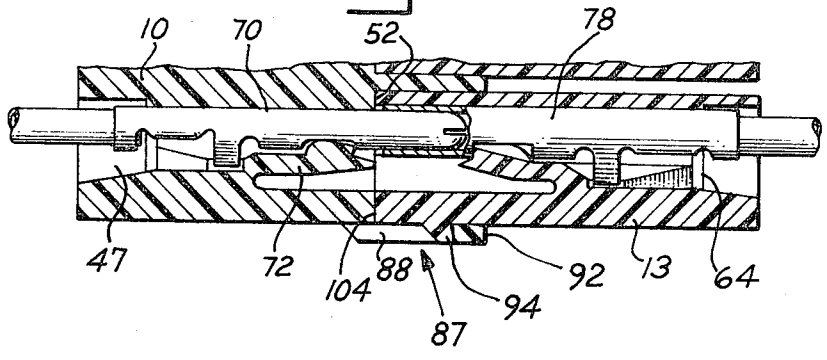


Fig 8



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3,530,424

MULTIPLE CONNECTOR

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Int. Cl. H01r 13/54
U.S. Cl. 339—91 8 Claims

ABSTRACT OF THE DISCLOSURE

A multiple connector adapted to be mounted on a curvilinear surface includes first and second housings having exterior faces of a shape to conform to the surface. The first of the housing carries a socket of curvilinear cross section into which one or more of the second housings which are also of curvilinear cross section are inserted, each of the housings including a plurality of passages for carrying electrical terminals therein. The housings include polarizing means for preventing disoriented insertion of the second housings in the socket and the housings include latching means for maintaining the housings in their inserted relationship.

BACKGROUND OF THE INVENTION

This invention relates to a new and improved multiple connector and, more particularly, to a multiple connector for a plurality of electrical terminals which is adapted to be mounted on a non-planar curvilinear surface.

In modern vehicles, and especially automobiles, the number of accessories which are designed to be controlled by the driver in and adjacent to the steering wheel of the vehicle has substantially increased. For example, such numerous accessories may include turn signals, horn, cornering lights, speed control devices and emergency flashers among others, which are designed to be controlled by appropriate control levers and the like which are positioned on the steering column adjacent the steering wheel of the vehicle. Since such accessory controls are mounted on or adjacent to the steering column, it is desirable to provide a terminal connector block or blocks closely adjacent the controls to enable easy access to the terminal blocks for repairing and assembling the accessories and their electrical circuits. Due to the multiplicity of circuits involved, such connector blocks are generally cumbersome and large and thus must be located a substantial distance from the steering column either beneath the dash panel or in the engine compartment of the vehicle. Such mounting requirements are particularly necessitated since the available steering column space is at a premium and if the relatively large connector block is mounted within the visibility of the driver and/or passenger visibility of the dashboard instruments would likely be impaired and an unpleasant appearance would result.

The multiple connector of my invention obviates the aforementioned disadvantages. The connector of my invention may be mounted within the steering column out of the view of the driver or passengers and closely adjacent the various accessories and their controls and will not impair the visibility of the driver. Moreover, a single connector block assembly may be provided to handle the multiple accessory circuits present in the modern day automobile and yet be extremely compact. The connector constructed in accordance with the principles of my invention is also rugged in use and capable of rapid and inexpensive manufacture and may be readily assembled by relatively inexperienced personnel. Also the connector of my invention may be readily employed even in the absence of one or more of the accessories thus allowing standardization.

These and other objects, features and advantages of my invention will become apparent upon consideration of the following detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

In the course of the description, reference will frequently be made to the drawings in which:

FIG. 1 is an exploded view of a preferred embodiment of connector constructed in accordance with the principles of my invention;

FIG. 2 is an end view of one of the connector housing blocks taken substantially along line 2—2 of FIG. 1;

FIG. 3 is an end view of four additional connector housing blocks taken substantially along line 3—3 of FIG. 1;

FIG. 4 is a fragmentary cross sectioned elevation view of a portion of a housing block taken substantially along line 4—4 of FIG. 2;

FIG. 5 is a cross sectioned elevation view of another of the housing blocks taken substantially along line 5—5 of FIG. 3;

FIG. 6 is a fragmentary side elevation view of one of the housing blocks as viewed substantially along arrow 6 of FIG. 2;

FIG. 7 is a side elevation view of another of the housing blocks as viewed substantially along arrow 7 of FIG. 3; and

FIG. 8 is a fragmentary cross sectioned elevation view of the housing blocks of FIGS. 4 and 5 in their assembled form.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. 1, a preferred embodiment of the connector of my invention is shown and includes a plurality of curved housing blocks **10**, **11**, **12**, **13** and **14**. The blocks are moulded of a suitable polymeric material. Housing block **10** is generally arcuate in shape and includes a pair of exterior stepped faces **16** and **18** and a pair of curved faces **20** and **22**. Curved face **20** has a curvature which substantially conforms to the curvature of the steering column (not shown) such that the housing **10** may be directly mounted against the curvilinear surface of the cylindrical steering column.

Housing block **10** carries at one end an extended potion **24** which forms a socket, generally **26**. The socket is divided into individual arcuately shaped receptacles **28**, **29**, **30** and **31** by a plurality of partitioning walls **33**, **34** and **35**. Referring particularly to FIG. 2, a plurality of parallel passages **37** through **50** extend from the base **52** of each of the receptacles to the other end of the housing block **10**, the longitudinal axes of the passages being substantially parallel to each other.

The four additional housing blocks **11**, **12**, **13** and **14** are adapted to be inserted in particular ones of the receptacles formed in housing block **10**. Housing block **11** is arcuate in shape and is adapted to be inserted in the arcuate receptacle **28**. Housing blocks **12**, **13** and **14** are also arcuately shaped and are adapted to be inserted in the arcuate shaped receptacles **29**, **30** and **31**, respectively. Referring particularly to FIG. 3, each of the housing blocks **11**, **12**, **13** and **14** also includes one or more longitudinally extending passages **54** through **67** which open to each end of their respective housing blocks and which are adapted to align with corresponding passages **37** through **50** in housing block **10** when the respective housing blocks have been inserted in their corresponding receptacles.

Each of the passages carries electrical terminal retaining means for retaining electrical terminals therein in such position that their respective terminals mate with the corresponding terminals of the aligned passages. The

construction of the terminals and their retaining means are not deemed to be the subject matter, as such, of the present invention, reference being had to the copending application of Taormina and McCardell, Jr., Ser. No. 711,675, filed Mar. 8, 1968, for a more detailed description of a suitable construction. However, a brief description of a suitable construction follows. Referring particularly to FIG. 4, a male terminal **70** is shown located in passage **47**. Preferably, passage **47** includes a resilient tang **72** having a latching abutment **74** located thereon which is adapted to engage a recess **76** in the terminal **70** when the terminal has been fully inserted into the passage. The tang **72** acts to restrain removal of the terminal **70** from the passage and positions the terminal in the passage such that it may mate with a corresponding female terminal. Referring to FIG. 5, the corresponding female terminal **78** is shown in its inserted position in passage **64** of housing block **13**. The female terminal **78** is also maintained in the passage **64** by a resilient tang **80** which also carries a latching abutment **82** which is adapted to snap into a recess **84** in the female terminal and engage the terminal when the terminal has been fully inserted in the passage.

Referring to FIGS. 1, 2, 4 and 6, portions of the extended portion **24** which outlines each of the receptacles **28, 29, 30** and **31** are slotted at **86** to form a latching element **87** having a generally rectangular aperture **88** defined by the longitudinally extending legs **90** formed by the slots **86**, the base **52** and a cross portion **92** of the receptacle wall. Since the housing block **10** and its extended portion **24** is moulded of a polymeric material, the latching element **87** is somewhat resilient. Referring particularly to FIGS. 1, 3, 5 and 7, each of the corresponding housing blocks **11, 12, 13** and **14** includes a raised shoulder **94** which is adapted to extend outwardly into each of the apertures **88** of the latching elements **87** of their respective receptacle when the housing blocks have been fully inserted into same.

The edge **96** and the inner face **98** of the cross portions **92** of each of the latching elements are somewhat beveled, as shown in FIG. 4. The shoulders **94** of the housing blocks also include a pair of angled surfaces **100** and **102** as shown in FIG. 5. As the end **104** of the housing block **13** is inserted into its receptacle **30**, the leading surface **100** of the shoulder **94** contacts the beveled surface **98** of the cross portion **92** acting to increasingly deform the resilient latching element **87** in an outward direction allowing the housing portion **13** to move all the way into the receptacle. When the shoulder **94** has passed the cross portion **92**, the latching element will again resume its initial position and the beveled edge surface **96** will engage surface **102** in a barbed relationship and urge the housing block **13** firmly in place in the receptacle **30** against the base **52**. The distance between the end **104** of housing block **13** and the point of intersection of surface **102** with the main body portion of housing block is substantially the same as the distance between the minimum longitudinal length of the aperture **88**. Thus, as the latching element **87** returns to its original undeformed position after the shoulder has passed, the beveled edge surface **96** of the cross portion will tend to urge the end **104** of housing block firmly against the base **52** of the receptacle, maintaining the housing blocks in firm association with each other. As the housing block **13** is inserted into the receptacle, the male terminal **70** mates with the female terminal **78**, establishing the desired electrical icrcuit. Housing block **13** is shown in its fully inserted position in FIG. 8.

To prevent disoriented insertion of the housing blocks and crossed circuits, the housing blocks include polarizing means. Thus only housing block **11** may be inserted in only one orientation and only in receptacle **28**; housing block **12** only in receptacle **29**, housing block **13** only in receptacle **30**, and housing block **14** only in receptacle **31**. Polarizing is accomplished in a number of different ways. The large housing block **11** is of such size that it may only be inserted into receptacle **28** and will not fit into the other receptacles. Also, since both receptacle **28** and housing block **11** are arcuate in shape, the housing block may be inserted into the receptacle in only one orientation, namely wherein the curvature of the housing block and the receptacle coincide. For substantially the same reasons housing blocks **12, 13** and **14** may only be inserted in receptacles **29, 30** and **31**, respectively, and in only a single orientation. Housing blocks **12** and **14** are also polarized with respect to receptacles **28** and **31** by a rib **106** which is adapted to be received in a recess **108** formed between partitioning wall **33** and the stepped portions of the stepped exterior walls **16** and **18**. Housing block **13** is also polarized with respect to receptacle **30** by a pair of projecting ribs **110** which are received in slots **112** formed in partition walls **34** and **35**. The ribs **110** and slots **112** are offset from the center of the housing block **13** and receptacle **30** to further avoid disorientation of the housing block. Moreover, the shoulders **94** of each of the housing blocks prevent upsidedown insertion of each of the blocks in their respective receptacles.

By way of example, where the connector is employed in the electrical circuits of multiple automotive accessories, housing block **11** and its associated receptacle **28** and terminals may be utilized to couple the six turn signal switch circuits and one horn circuit; housing block **12** and its associated receptacle **29** and terminals to couple three cornering light circuits; housing block **13** and its associated receptacle **30** and terminals to couple the emergency flasher circuit, and housing block **14** and its associated receptacle **31** and terminals to couple the speed control circuits. Since each of the receptacles is separated from each other by partition walls **33, 34** and **35**, the connector may be uniformly used in all automobiles irrespective of whether certain of the accessories are present or absent, since each of the housing blocks is inserted and held independently in their respective receptacles. Thus the multiple connector may be used even though, as an example, the speed control accessory is not present. The above described connector is therefore capable of standardized use since different connectors need not be provided where the accessory load is varied.

It is to be understood that the embodiment of the invention which has been described is merely illustrative of one application of the principles of the invention. Numerous modifications may be made by those skilled in the art without departing from the true spirit and scope of the invention.

What is claimed is:

1. A multiple terminal connector adapted to be mounted about at least a portion of a substantially curvilinear surface, said connector comprising:

a first housing having an exterior face thereon of a shape to substantially conform with the curvilinear surface,

a first plurality of elongated passages extending in a direction substantially parallel to said face,

means in each of said first passage for mounting a terminal therein,

socket means formed at one end of said first housing, said passages communicating between said socket means and the end of said housing opposite said one end, said socket means including partition means partitioning said socket means into a plurality of individual receptacles,

a plurality of second housings being normally inserted in respective ones of said receptacles and having an exterior face thereon of a shape to substantially conform with the curvilinear surface,

second elongated passages extending through said second housings in a direction substantially parallel to their said face, the longitudinal axes of said first and second passages being in substantial alignment with

each other when said second housings are inserted in said receptacles,

means in each of said second passages for mounting a terminal therein, and

latching means on each of said first and second housings and receptacles for retaining said second housings in said inserted location in said receptacles.

What is claimed is:

2. The connector of claim 1 wherein said latching means comprises a resilient member on said socket means having an aperture therein and a shoulder on one of said second housings constructed and arranged to enter said aperture when said second housing is inserted in said socket means.

3. The connector of claim 1 wherein each of said individual receptacles and second housings include polarizing means to prevent the insertion of a given one of said second housings in any but one of said receptacles.

4. The connector of claim 3 wherein said polarizing means of at least some of said receptacles and second housings is defined by the size of said second housings relative to the receptacles.

5. The connector of claim 3 wherein said polarizing means of at least some of said receptacles and second housings is defined by the geometric shape of said second housings relative to the receptacles.

6. The connector of claim 3 wherein said polarizing means of at least one of said receptacles and second housings comprises a rib projecting beyond the exterior surface of said one second housing, and a recess defined in the wall of said one receptacle for slideably receiving said rib therein.

7. The connector of claim 1 wherein each of said receptacles and said second housings are defined by a pair of curvilinear walls, the curvilinear planes of said walls extending substantially parallel to said curvilinear exterior faces of said first and second housings.

8. The connector of claim 7 wherein said first and second housings are substantially arcuate in shape.

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U.S. Cl. X.R.

339—186