United States Patent [19]

Plyler et al.

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[54] **PRINTED CIRCUIT CONNECTOR TERMINAL**

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[73] Assignee: **General Motors Corporation**, Detroit, Mich.

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[21] Appl. No.: **388,016**

[52] **U.S. Cl.**..... **339/17 LC**, 339/95 D, 339/217 R

[51] **Int. Cl.** **H01r 9/12**, H05k 1/07

[58] **Field of Search** ..... 339/17, 18, 75, 65, 66, 339/95-99, 176, 217, 219-221, 256, 258, 59, 61; 317/101 C, 101 CC

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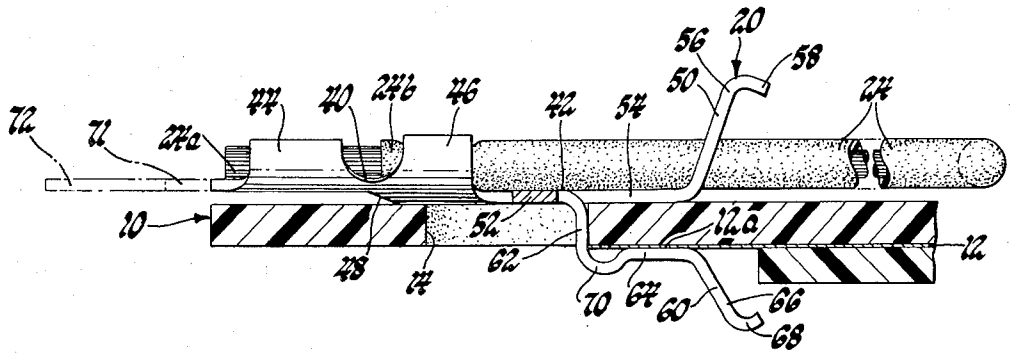
Assistant Examiner—Terrell P. Lewis
Attorney, Agent, or Firm—W. A. Schuetz

[57] **ABSTRACT**

In a preferred form, this disclosure relates to an electrical connector means comprising a printed circuit board having a given thickness, conductor strips thereon, and a row of through apertures spaced from each other adjacent one end thereof, a plurality of individual terminals received within the openings and connected to the circuit board, and an insulator housing means for the circuit board and terminals after they are connected thereto. The terminals and insulator housing are of a construction and arrangement such that the terminals serve the dual function of electrically connecting a wire conductor to the circuit board as well as to biasingly retain the circuit board in place within the housing.

5 Claims, 13 Drawing Figures



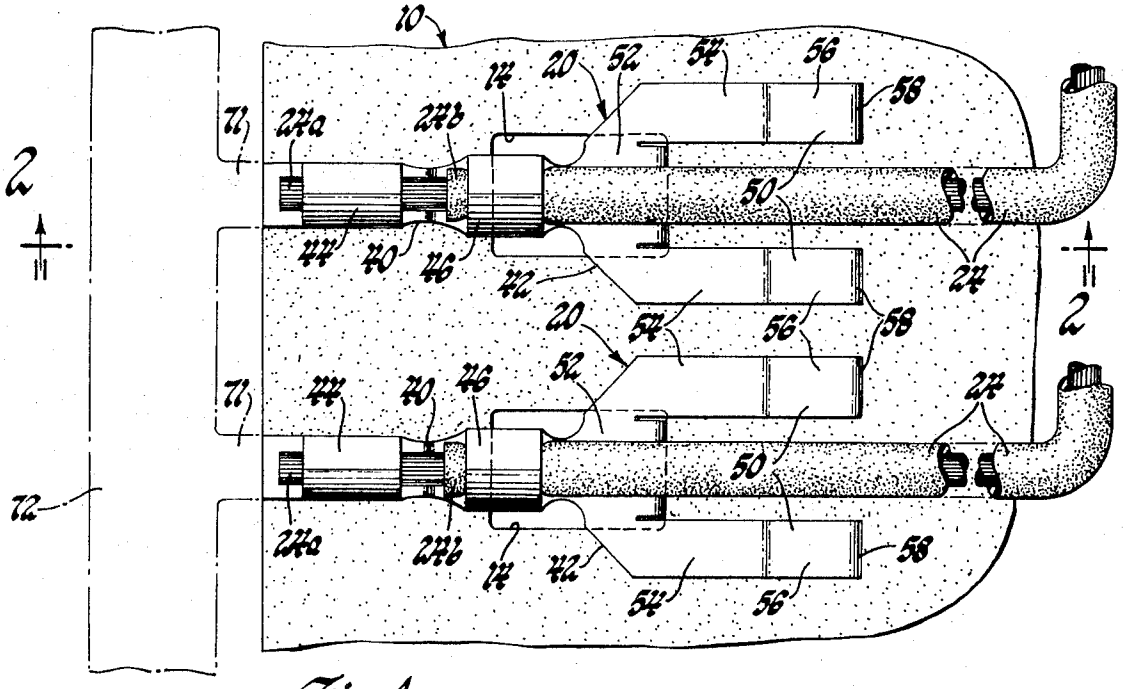


Fig. 1

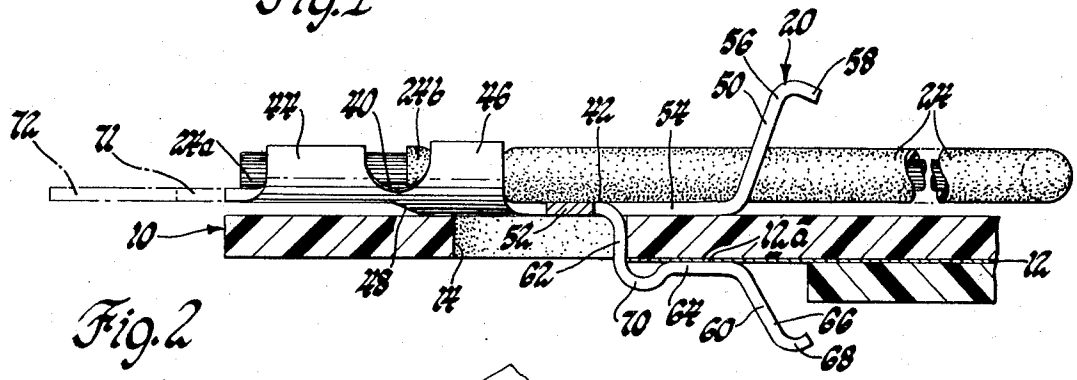


Fig. 2

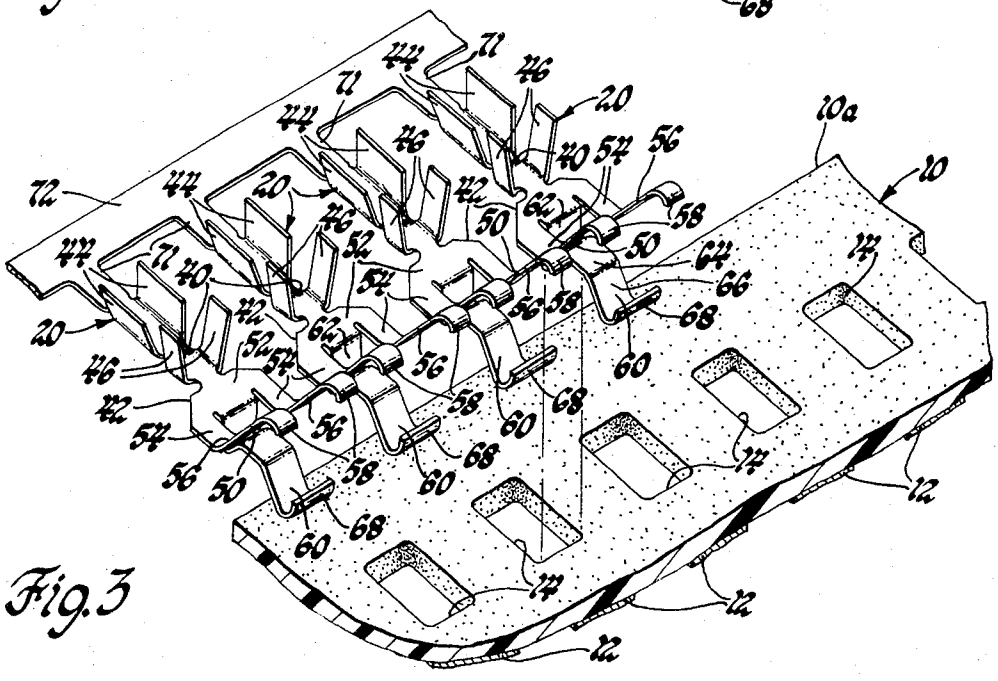


Fig. 3

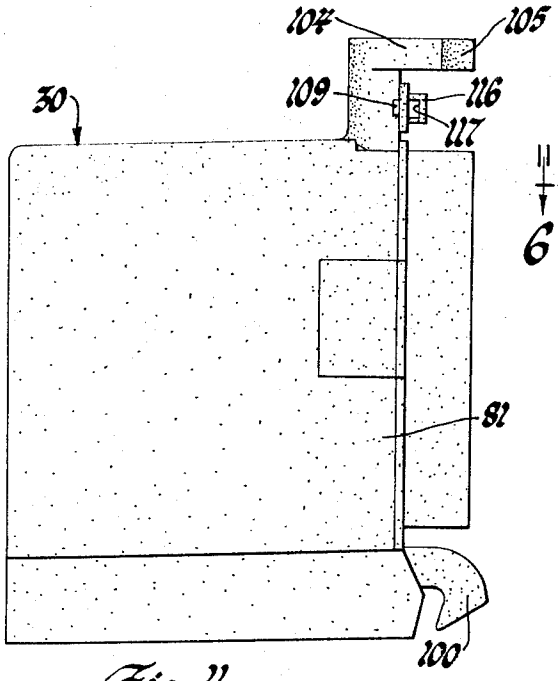


Fig. 4

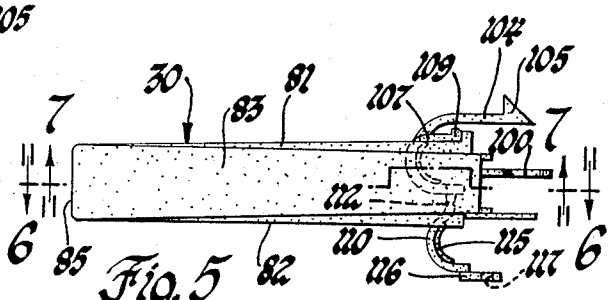


Fig. 5

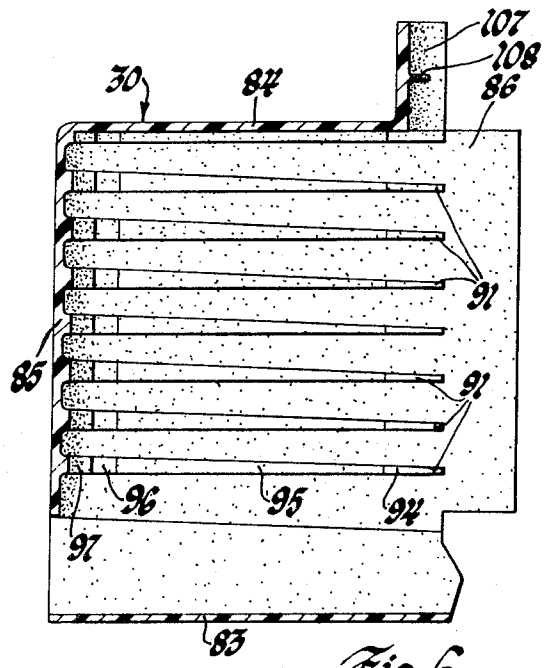


Fig. 6

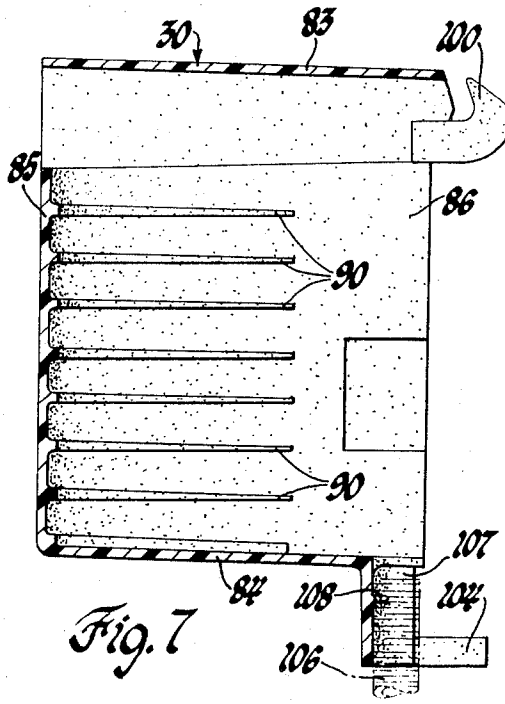


Fig. 7

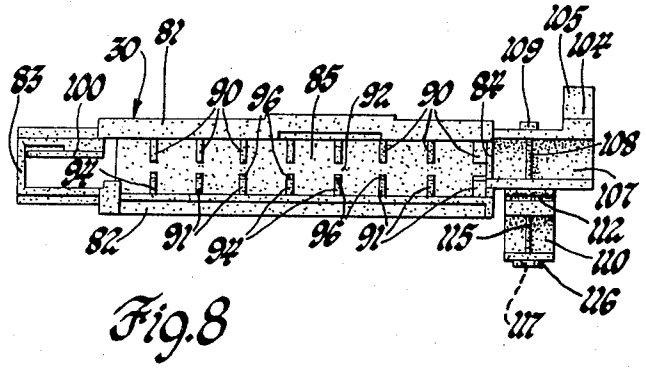


Fig. 8

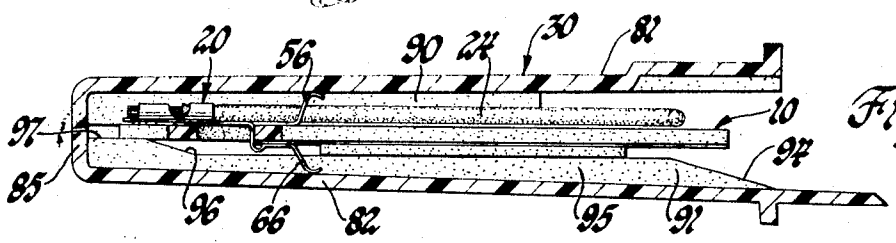


Fig. 9

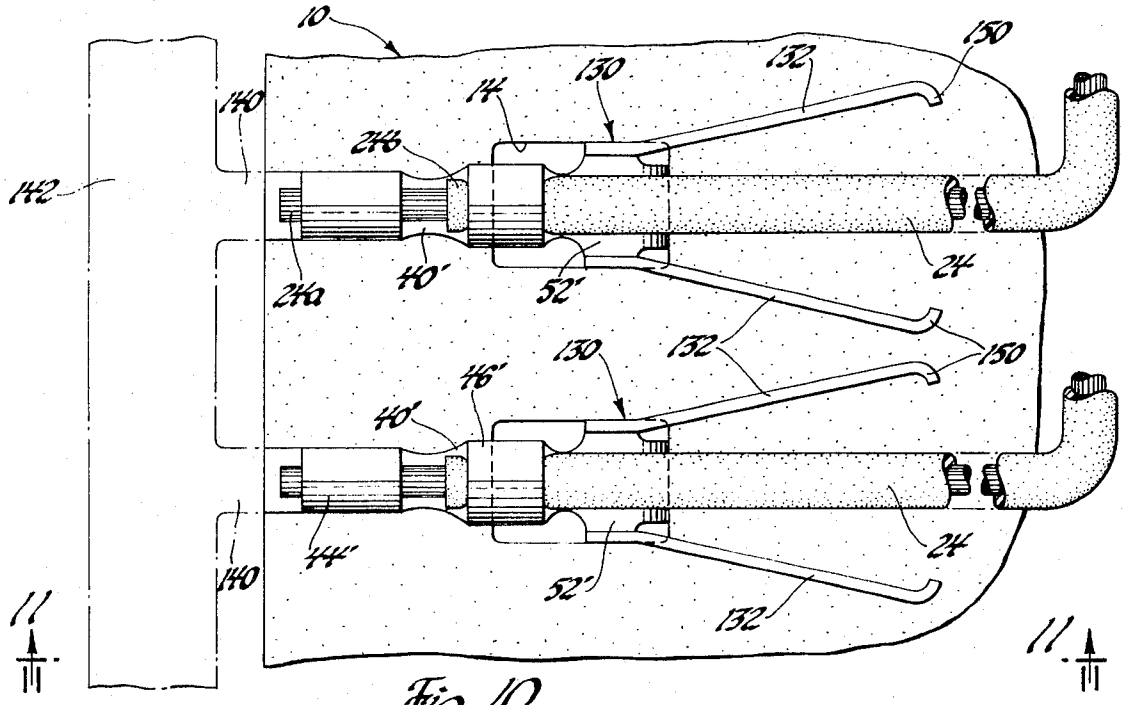


Fig. 10

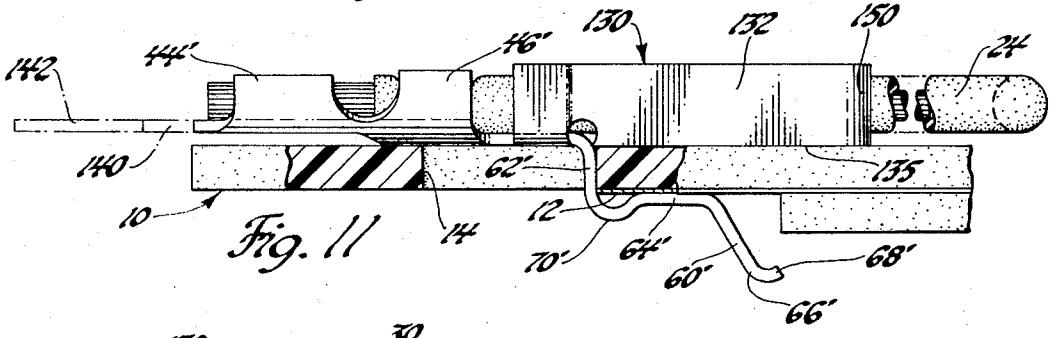


Fig. 11

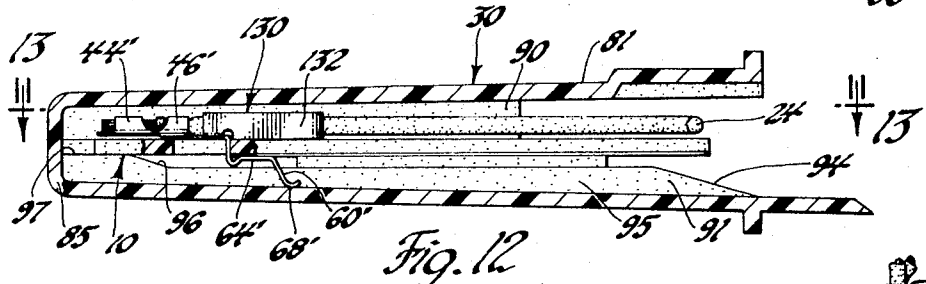


Fig. 12

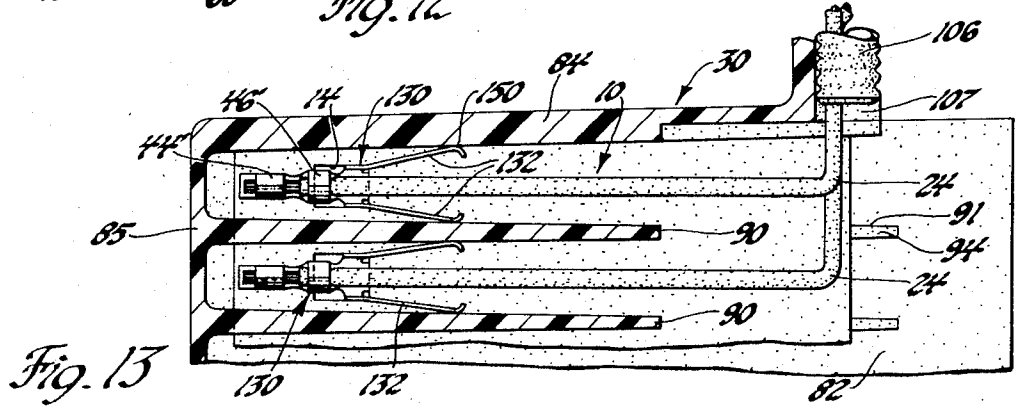


Fig. 13

PRINTED CIRCUIT CONNECTOR TERMINAL

The present invention provides an electrical connector means, and in particular, an electrical connector means comprising, in combination, a printed circuit board having a plurality of conductor strips thereon and a row of through openings spaced inwardly from an adjacent side edge of the printed circuit board, a plurality of terminals which are adapted to be simultaneously connected to the circuit board, a wire conductor connected to each terminal, and a plastic insulator housing for housing the printed circuit board, terminals and conductors.

Heretofore, various terminals for engaging contact areas on one or both sides adjacent an edge of a printed circuit board have been provided to achieve an electrical connection between printed circuits on the circuit board and an electrical component. Housings have also been provided for retaining of the printed circuit boards and terminals.

The present invention provides a novel electrical connector means of the above noted type, but in which the printed circuit board has a row of openings spaced inwardly from its side edge and located adjacent contact areas of printed circuits and in which the various individual terminals are integrally connected via webs to a carrier strip and crimped onto wire conductors. The terminals are adapted to be simultaneously connected to the printed circuit board and thereafter the carrier strip is severed from the terminals. The present invention also includes a housing means for housing the circuit board and terminals. The terminals are of a novel construction such that they both provide an electrical connection to the printed circuit board and cooperate with the housing means to biasingly retain the printed circuit board within the housing.

Accordingly, an important object of the present invention is to provide a new and improved electrical connector means comprising a printed circuit board having a row of openings spaced inwardly from its adjacent side edge and located adjacent contact areas of printed circuits thereon and a plurality of electrical terminals integrally connected via webs to a carrier strip and which include spaced fingers for receiving the printed circuit board, and wherein the terminals are simultaneously connected to the printed circuit board by inserting one of the fingers through he adjacent openings in the circuit board, simultaneously moving the terminals relative to the circuit board so that the latter adjacent the openings is received between the fingers of each terminal and thereafter severing the carrier strip from the individual terminals.

A further object of the present invention is to provide a new and improved electrical connector means, as defined in the preceding object, and in which the terminals each comprise a pair of first laterally spaced fingers for engaging one side of the printed circuit board and a second finger having a first section extending transversely of the first finger, an intermediate section for engaging the opposite side of the printed circuit board and a third section extending transversely of the second section, and in which the printed circuit board is thicker than the spacing between the first and second fingers whereby the printed circuit board is biasingly engaged by the flexible fingers when received therebetween.

Yet another object of the present invention is to provide a new and improved electrical connector means, as defined in the next preceding object, and which further includes a housing means of a generally rectangular shape for receiving the printed circuit board, and in which the housing means includes a plurality of laterally spaced inwardly extending ribs on two opposite sides of the housing and wherein the resilient fingers are received between the adjacent ribs when the circuit board is inserted therein and the second finger deflected toward the circuit board by the housing means so that the printed circuit board is biasingly retained within the housing against the ribs on one side thereof.

A still further object is to provide a new and improved electrical connector means, as defined in the next preceding object, and wherein the first fingers of the terminals are substantially planar, engage the circuit board along their side edges and are deflected toward each other by the ribs on one side of the housing means when inserted between the ribs to aid in locating and retaining the circuit board within the housing means.

The present invention further resides in various novel constructions and arrangement of parts, and further objects, novel characteristics and advantages of the present invention will be apparent to those skilled in the art to which it relates and from the following detailed description of the illustrated embodiments thereof made with reference to the accompanying drawings forming a part of this specification and in which similar reference numerals or characters are employed to designate corresponding parts throughout the several views, and in which:

FIG. 1 is a fragmentary top plan view of a printed circuit board and terminals of the electrical connector means of the present invention;

FIG. 2 is a cross-sectional view taken approximately along line 2—2 of FIG. 1;

FIG. 3 is a perspective view of thetermainal of the electrical connector means of the present invention;

FIG. 4 is a plan view of an insulator housing comprising part of the electrical connector means of the present invention;

FIG. 5 is a side elevational view of the housing means shown in FIG. 4;

FIGS. 6 and 7 are fragmentary sectional views looking in the direction of the arrows 6—6 and 7—7 of FIG. 5;

FIG. 8 is a front elevational view of the housing shown in FIG. 4;

FIG. 9 is a cross-sectional view of the housing like that shown in FIG. 4, but showing the printed circuit board and terminals connected thereto;

FIG. 10 is a view like FIG. 1, but showing an alternate embodiment of the terminals of the electrical connector means of the present invention;

FIG. 11 is a cross-sectional view taken approximately along line 11—11 of FIG. 10;

FIG. 12 is a cross-sectional view of the housing shown in FIG. 4, but showing the printed circuit board and terminals of FIG. 10 connected thereto; and

FIG. 13 is a fragmentary top plan view of the electrical connector means shown in FIG. 12.

The present invention provides a novel electrical connector means. Referring to FIGS. 1–9, the electrical connector means comprises, in general, a printed circuit board 10 having a plurality of printed conductor

strips or circuits 12 thereon and a row of through rectangularly shaped openings 14 spaced inwardly from an adjacent end or side edge 10*a* of the circuit board, a plurality of electrical terminals 20 which are received within the openings 14 and connected to the circuit board 10 adjacent the sides defining the openings 14, a plurality of wire conductors 24 which are crimped to the terminals 20 and a housing means 30 for receiving and housing the printed circuit board and terminals 20. The terminals 20, as will be hereinafter more fully described, function to provide both an electrical engagement between the wire conductors 24 and contact areas 12*a* of the printed circuits and to biasingly hold the printed circuit board in place within the housing 30.

The printed circuit board 10 made from any suitable electrically insulating material comprises a flat planar member. The conductor strips 12 are made from metal and are preferably bonded to the planar insulating member. The openings 14 are in a row and are spaced inwardly from the side surface 10*a* of the printed circuit board.

The terminals 20 are made from suitable or conventional, thin, flat metal stock which is cut and thereafter bent to the configuration shown in FIG. 3. The terminals 20 include a rearward portion 40 and a forward portion 42. The rearward portion 40 includes spaced pairs of crimping flanges 44 and 46, which are adapted to be crimped onto the bare end 24*a* and insulator portion 24*b* of the wire conductor 24, as shown in FIG. 1. The wire conductor 24, upon being crimped to the crimping flanges 44, 46 lies over the forward portion 42 of the terminal 20. The rearward portion 40 is also bent to provide an upwardly extending beveled surface 48 intermediate its ends, and for reasons which will be more fully described hereinafter.

The forward portion 42 includes a pair of laterally spaced upper fingers 50 which are integrally connected by a transverse bridge section 52 adjacent their ends closest to the rearward portion 40. The fingers 50 each comprise a first or inner section 54 which is adapted to engage one side of the printed circuit board and a second or outer section 56 extending transversely of the first section 54 and which terminate in a curved free or outer end 58. The second section 56 forms an obtuse included angle with the first section 54, preferably of approximately 110°.

The forward portion also includes a lower finger 60 which is integral with the bridge portion 52 intermediate the upper fingers 50. The lower fingers 60 include a first or inner section 62 extending transversely or normal to the first section 54 of the upper fingers 50, an intermediate or second section 64 which is adapted to engage the opposite side of the printed circuit board when the latter is received between the fingers 50 and 60 and an outer or third section 66 which extends transversely outwardly of the intermediate section 64 and which terminates in a curved free or outer end 68. The outer section 66 forms an obtuse included angle with respect to the intermediate sections 64, preferably of approximately 110°.

The terminals 20 are preferably made from a metallic material which is flexible and substantially resilient. That is, a material which can be deformed to a new shape, but yet be resilient enough to provide good spring back characteristics. The transverse distance between the sections 54 and 60 of the fingers 50 and 60 when the terminal 20 is in its free state is less than the given thickness of the printed circuit board 10. The intermediate section of the finger 60, when in its free state, forms an acute included angle with respect to the first section 54 of the fingers 50, but is adapted to be disposed parallel with respect to the first sections 54 when the printed circuit board is received between the fingers 50 and 60. The flexibility of the finger 60 is enhanced by providing the fingers 60 with a reversely bent bight portion 70 at the juncture of the sections 62 and 64. The radius of the bight portion 70 is such that the sections 64 and 66 of the finger 60 can be flexed and still have excellent spring back toward its free state position.

As alluded to hereinbefore, the terminals 20 are stamped and bent to the configuration shown in FIG. 3 by a suitable punch and die apparatus. The terminals 20 are initially integrally connected via webs 71 to a carrier strip 72, shown in phantom in FIG. 1. While the terminals remain connected to the carrier strip 72, the individual insulated wire conductors are crimped to the terminals 20 via the crimping flanges 44 and 46.

The terminals 20 are adapted to be simultaneously connected to the printed circuit board 10. The terminals 20 are connected by inserting the fingers 60 through the openings 14 in the printed circuit board 10 and thereafter pulling the terminals 20 via the wire conductors 24 to the right, as viewed in FIG. 2, so that the edges of the circuit board 10 adjacent the openings 14 are received between the fingers 50 and 60. The circuit board 10 adjacent its lower side will have a contact area 12a which is engaged by the finger 60 to provide an electrical contact therebetween. During connection of the terminals 20 to the circuit board 10, the fingers 60 will be deflected downwardly slightly, since they are more flexible than the fingers 50 due to the provision of the bight portions 70. After the terminals 20 are connected to the printed circuit board 10, the carrier strip 72 is severed by a suitable punch and die so as to leave the individual terminals 20 connected to the board 10, but separated from one another.

The printed circuit board 10 and terminals 20 when connected thereto are adapted to be connected to the housing 30. The housing 30 is made from a suitable insulating material, such as plastic, and is of a generally rectangular, hollow shape having upper, lower and side walls 81–84, respectively. The housing also has a closed end wall 85 at one end and an open end 86 at its opposite end. Extending inwardly from the upper wall 81 are a plurality of integral, laterally spaced, thin longitudinally extending ribs 90. Extending inwardly from the bottom wall 82 are a plurality of integral, laterally spaced longitudinally extending ribs 91. The ribs 90 and 91 are aligned with each other, but spaced apart to provide a transversely extending space 92 into which the circuit board 10 can be inserted. The ribs 91, as best shown in FIG. 9, have a bevelled entry end 94 to guide the circuit board 10 between the ribs 90 and 91 when inserted therein, a first intermediate portion 95 of a given height, a second bevelled cam surface portion 96 intermediate its ends, and an end portion 97 of a greater height than the portion 95. The ribs 91 also have an increasing thickness proceding from the open end 86 of the housing toward the closed end 85 of the housing.

The circuit board 10 is adapted to be inserted within the housing 30, terminal end first. As it is inserted within the housing 30, the circuit board 10 will be re-

ceived between the ribs **90** and **91** and with the terminals **20** being received between adjacent ones of the ribs **90** and **91.** It should be noted at this point that the dimension between the outer free ends **58, 68** of the upper fingers **50** and the lower fingers **60** when the terminal is being connected to the circuit board **10** is greater than the transverse distance between the upper and lower walls **81** and **82.** Thus, as the terminals **20** are received between the ribs **90** and **91,** the outermost leg sections **56** and **66** will be deflected toward each other. The upper sections **56** of the terminals **20** will flex a greater extent than the sections **66,** since they are more flexible due to their greater length. The circuit board **10** is thus biased upwardly against the ribs **90** by the sections **66** of the terminals and biasingly held in place. When the board **10** is fully inserted, its forward end will be received between the sections **97** of the ribs **91** and the ribs **90.** The reason for the different height portions **95, 97** is that the circuit board has different portions of different thicknesses. The beveled surface **96** will cam the board **10** onto the rib portion **97** should the board **10** not be engaged with the ribs **90** as it is being inserted into the housing **30.**

It should be apparent that the terminals **20** provide the dual function of providing an electrical connection between the contact area of the printed circuit board and the wire conductor as well as to biasingly hold the circuit board **10** in place within the housing **30.** The provision of the tapered ribs **91,** causes the lower fingers **60** to be guided so that the circuit board **10** is located within a predetermined location within the housing **30.**

The housing **30** is adapted to be connected to a mating connector housing (not shown) containing terminals which engage the opposite end of the printed circuit board. To this end, the housing **30** has an integral hook **100** formed integral with its side **83** which is adapted to be received wihtin a suitable opening and mate with a catch in the mating connector housing and a deflectable forwardly extending finger **104** having an enlarged end **105** which is adapted to be snapped fittingly received within a catch member formed integral with the mating connector housing.

The various wire conductors, which extend between the adjacent ribs **90,** are adapted to a bent 90° and be contained within an axially slit corrugated conduit **106** connected to the housing **30** and shown in phantom in FIG. **7.** To this end, the housing includes a stationary semi-circular portion **107** extending transversely of its right sidewall **84.** The semi-circular portion has a semi-circular radially inwardly extending rib **108** and a nib or catch **109** formed integral therewith at its upper end. The deflectable finger **104** is also formed integral with the upper end of the portion **107.** The portion **107** has formed integral therewith adjacent its lower end, as viewed in FIG. **8,** a second semi-circular portion **110** which is integrally hinged to the semi-circular portion **107** via a flexible hinge **112.** The semi-circular portion **110** has a semi-circular radially inwardly extending rib **115.** The semi-circular portion **110,** adjacent its free end, carries a deflectable latch **116** having an opening **117** therein.

The corrugated tube **196** is adapted to be connected to the housing by positioning the end of the tube within the semi-circular portion **107** and with the rib **108** being received between adjacent ones of the corrugations and then moving the semi-circular portion **110** upwardly about its hinge **112** towards the portion **106** and with its rib **115** being received between adjacent ones of the corrugations until the latch **116** engages the catch **109** and is deflected thereover to receive catch **109** within the opening **117.** This secures the corrugated tube **106** to the housing **30.**

FIGS. **10–13** show a second and preferred embodiment of an electrical connector means of the present invention. The electrical connector means of FIGS. **10–13** is identical to the electrical connector means of FIGS. **1–9,** except that different terminals **130** are employed. The parts of the electrical connector means of FIGS. **10–13,** which are identical to the parts of the electrical connector means of FIGS. **1–9,** have been given the same reference numerals.

The terminals **130** are of an identical construction to the terminals **20** except that different first fingers **132** are provided. The portions of the terminals **130** which are identical to the portions of the terminals **20** have been given the same reference numerals, but with a prime affixed thereto.

The fingers **132** of the terminals **130** are of substantially planar and rectangular shape. The fingers **132** adjacent their ends closest to the rearward portion **40'** are bent upwardly so as to be disposed perpendicularly to the bridge section **52'.** The fingers **132** along their lower side edges **135** are adapted to engage the top side of the printed circuit board **10.** The terminal **130,** when in its free state, has a transverse dimension between the lower side edges **135** of the fingers **132** and the intermediate section **64'** of the finger **60'** which is less than the thickness of the circuit board **10.**

The terminals **130** are interconnected via webs **140** to a carrier strip **142** and are adapted to be simultaneously connected to the circuit board **10** in the same manner as previously described in connection with the terminals **20** except that the side edges **135** of the fingers **132** engage the top side of the circuit board **10.** The finger **60'** deflects about its bight portion **70'** when being connected to the circuit board **10** and biases the circuit board against the side edges **135** of the upper fingers **132.** After the terminals are simultaneously connected to the circuit board **10,** the webs **140** are severed to individually separate the terminals **130.**

The fingers **132** have curved outer ends **150** so are laterally bent at the bridge section **52'**so as to diverge away from each other proceeding from the bridge section **52** toward their outer ends **150.** The transverse distance between the outermost sides of the curved ends **150** is slightly greater than the transverse distance between adjacent ribs **90** of the housing means **30.**

The circuit board **10** containing the terminals **130** is connected to the housing means **30** in the same manner as the circuit board **10** containing the terminals **20** except that the fingers **132** are deflected toward each other by the adjacent facing sides of the ribs **90.** Entry of the fingers **132** between the ribs **90** is facilitated by the curved ends **150.** The finger **60** serves to bias the circuit board **10** against the underside of the ribs **90** and the fingers **132** serve to locate and aid in retaining the circuit board **10** in place. The fingers **132, 60** also serve to prevent rattling of the circuit board **10** within the housing means **30** when connected thereto.

Although the illustrated embodiments hereof have been described in great detail, it should be apparent that certain modifications, changes, and adaptations may be made in the illustrated embodiments, and that

it is intended to cover all such modifications, changes and adaptations which come within the spirit of the present invention.

What is claimed is:

1. An electrical connector means comprising, in combination, a printed circuit board having a plurality of conductor strips thereon and a row of through openings spaced wholly inwardly from adjacent side edges of the printed circuit board, terminal means including a carrier strip and a plurality of terminals integrally connected to the carrier strip via webs in a spaced relationship corresponding to the spaced relationship of said through openings whereby said terminals are simultaneously alignable with said through openings, and a wire conductor connected to each terminal, said terminal means being connected to said printed circuit board with said carrier strip and portions of said webs overhanging said terminal board,

each of the terminals having a rearward portion and a forward portion, said rearward portion having a crimping flange which is crimped onto an end of wire conductor wtth the wire conductor overlying said forward portion and said printed circuit board to space said wire conductor from said carrier strip and said overhanging portions of said webs, said forward portion of said terminals including a pair of first laterally spaced fingers having sections engaging a first side of said printed circuit board and a second flexible finger having a first section extending transversely of said first fingers disposed in one of said through openings, a second section extending generally in the same direction as the first fingers biasingly engaging a side of said printed circuit board opposite said first side, at least one of said fingers engaging a contact area of the conductor strips on the circuit board, said terminals being simultaneously connectable with the circuit board by aligning respective terminals with respective openings, moving the second fingers through the through openings and then simultaneously moving the terminals relative to the circuit board so that portions of the circuit board adjacent said openings are slidably received between and biasingly engaged on opposite sides by said first fingers and said second sections of the second fingers, said carrier strip being integral with the rearward portion of the terminals and severable therefrom via said overhanging web portions after the latter are connected to the printed circuit board to separate the individual terminals from each other.

2. An electrical connector means comprising, in combination, a printed circuit board having a plurality of conductor strips thereon and a row of through openings spaced inwardly from adjacent side edges of the printed circuit board, terminal means including a carrier strip and a plurality of terminals integrally connected to the carrier strip via webs in a spaced relationship corresponding to the spaced relationship of said through openings whereby said terminals are simultaneously alignable with said through openings, and a wire conductor connected to each terminal, said terminal means being connected to said printed circuit board with said carrier strip and portions of said webs overhanging a side edge of said terminal board,

each of the terminals having a rearward portion and a forward portion, said rearward portion having spaced pairs of crimping flanges which are crimped onto the bare end and insulator portion of a wire conductor with the wire conductor overlying said forward portion and said printed circuit board to space said wire conductor from said carrier strip and said overhanging portions of said webs, said rearward portion engaging one side of said printed circuit board between said side edge and one of said through openings, said forward portion including a pair of first laterally spaced generally planar upright fingers having lower edges engaging said one side of the printed circuit board at a location on the opposite side of said through opening from said side edge, and a second flexible finger having a first section extending transversely of said lower edges of said first fingers and engaging a side surface defining said through opening at a location remote from said side edge, and a second section extending generally in the same direction as the first fingers and biasingly engaging the opposite side of the printed circuit board, said second finger engaging a contact area of a conductor strip on the circuit board and said terminals being connectable with the circuit board by aligning respective terminals with respective openings, moving the second fingers through the through openings and then moving the terminals relative to the circuit board so that portions of the circuit board adjacent said openings are slidably received between and biasingly engaged on opposite sides by said lower edges of said first fingers and said second sections of the second fingers, said first sections of said second fingers being disposed in said openings and being engageable with the side surfaces defining said openings at locations remote from the side edge to locate the terminals relative to the circuit board, said carrier strip being integral with the rearward portion of the terminals and severable therefrom via said overhanging web portions after the latter are connected to the printed circuit board to separate the individual terminals from each other.

3. An electrical connector means comprising, in combination, a printed circuit board having a plurality of conductor strips thereon and a row of through openings spaced inwardly from adjacent side edges of the printed circuit board, terminal means including a carrier strip and a plurality of terminals integrally connected to the carrier strip via webs in a spaced relationship corresponding to the spaced relationship of said through openings whereby said terminals are simultaneously alignable with said through openings, and a wire conductor connected to each terminal, said terminal means being connected to said printed circuit board with said carrier strip and portions of said webs overhanging a side edge of said terminal board,

each of the terminals having a rearward portion and a forward portion, said rearward portion having spaced pairs of crimping flanges which are crimped onto the bare end and insulator portion of a wire conductor with the wire conductor overlying said forward portion and said printed circuit board to space said wire conductor from said carrier strip and said overhanging portions of said webs, said rearward portion engaging one side of said printed circuit board between said side edge and one of said through openings, said forward portion including a pair of first laterally spaced flexible fingers having a planar first section engaging said one side

of said printed circuit board at a location on the opposite side of said through opening and a second section extending transversely outwardly therefrom, and a second flexible finger having a first section extending transversely of said first section of said first fingers and engaging a side surface defining said through opening at a location remote from said side edge, and a second section extending generally in the same direction as the first fingers, and a third section extending transversely outwardly from said second section, said planar first sections of said pair of first fingers and said second section of said second fingers engaging said one side and the opposite side of said printed circuit board respectively, at least one of said fingers engaging a contact area of a conductor strip on the circuit board, said terminals being connectable with the circuit board by aligning respective terminals with respective openings, moving the second fingers through these respective openings, and then moving the terminals relative to the circuit board so that portions of the circuit board adjacent said openings are slidably received between and biasingly engaged by said planar first sections of said first fingers and said second sections of said second fingers, said first sections of said second fingers being disposed in said openings and being engageable with the side surfaces defining said openings at locations remote from the side edge to locate the terminals relative to the circuit board, said carrier strip being integral with the rearward portion of the terminals and severable therefrom via said overhanging web portions after the latter are connected to the printed circuit board to separate the individual terminals from each other.

4. An electrical connector means comprising, in combination, a printed circuit board having a given thickness, conductor strips thereon and a row of through apertures spaced from each other adjacent one end thereof, a plurality of individual terminals received within said openings and connected to said circuit board, a wire conductor connected to each terminal, and an insulator housing means for said circuit board and terminals, said terminals each comprising a rearward portion having crimping flanges for crimping a wire conductor thereto and a forward portion including a pair of first laterally spaced flexible fingers engaging one side of the circuit board, and a second flexible finger having a first section extending transversely of said first fingers, a second section engaging the circuit board on its side opposite said one side, and a third section extending transversely of said second section, said second section of said second fingers being laterally spaced from said first fingers a distance less than the given thickness of the circuit board, said forward portion of said terminals being connectable to the circuit board by relatively moving the circuit board and terminals so that the circuit board adjacent the openings is slidably received between the fingers and with the second finger biasingly engaging said opposite side of the circuit board, said second finger engaging a conductor strip on the circuit board,

said housing being generally rectangular in shape and having an open end and a closed end, said housing having a plurality of laterally spaced inwardly extending ribs on first and second opposite sides and with the ribs on the first and second sides being spaced apart a distance greater than the thickness of the circuit board, the transverse distance between the ribs of said first side and said second side being less than the thickness of the circuit board plus the perpendicular distance between the circuit board and third section of the second fingers adjacent their outer ends, said circuit board being disposed in the housing between the ribs with said first and second fingers being disposed between adjacent ones of the ribs on said first and second sides respectively, said circuit board being biased into engagement with said ribs on said first side by said second fingers engaging said second side of said housing and being deflected toward said circuit board to biasingly retain the circuit board in place within the housing.

5. An electrical connector means comprising, in combination, a printed circuit board having a given thickness, conductor strips thereon and a row of through apertures spaced from each other and spaced inwardly from one end thereof, a plurality of individual terminals received within said openings and connected to said circuit board, a wire conductor connected to each terminal, and an insulator housing means for said circuit board and terminals, said terminals each comprising a rearward portion having crimping flanges for crimping a wire conductor thereto and a forward portion including a pair of first laterally spaced flexible fingers having a first section engaging one side of the circuit board and a second section extending transversely of said first section, and a second flexible finger having a first section extending transversely of said first fingers, a second section engaging the circuit board on its side opposite said one side, and a third section extending transversely of said second section, said third section of said second finger being of a lesser length than the second section of said first fingers, said second section of said second fingers being laterally spaced from the first section of said first fingers a distance less than the given thickness of the circuit board, said forward portion of said terminals being connectable to the circuit board by relatively moving the circuit board and terminals so that the circuit board adjacent the openings is slidably received between the fingers and with the fingers biasingly engaging the opposite sides of the circuit board, at least one of the fingers engaging a conductor strip on the circuit board,

said housing being generally rectangular in shape and having an open end and a closed end, said housing having a plurality of laterally spaced inwardly extending ribs on first and second opposite sides and with the ribs on the first and second sides being aligned and spaced apart a distance greater than the thickness of the circuit board, the transverse distance between the first and second sides being less than the perpendicular distance between the second section of the first fingers and the third section of the second finger adjacent their outer ends, said circuit board being disposed in the housing between the ribs with said first and second fingers being disposed between adjacent ones of the ribs on said first and second sides respectively, said first and second fingers engaging said first and second sides respectively and being deflected toward each other, said first fingers deflecting a greater extent than said second fingers, said circuit board being biased into engagement with said ribs on said first side by said second fingers to biasingly retain said circuit board in place with said housing, and means on said housing for connecting a tubular flexible member to the housing for housing and routing the wire conductors.

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