

Description

This invention relates to multicontact electrical connectors, particularly to electrical connectors for establishing an insulation displacement contact with conductors, such as wires, and interconnecting the conductors to a plurality of contact elements such as pins located in one or more rows in a pin grid array.

U.S. Patent 4,159,158 discloses a multicontact electrical connector using insulation displacement or displacement terminals to interconnect individual wires or conductors to terminal posts on 2.54 mm (0.100 inch) centers on a printed circuit or panel board. That connector employs a plurality of individual terminals each having an insulation displacement contact section in which a wire is inserted into the contact terminal. The connector housing in which the contact terminal is positioned supports the contact terminal axially as a conductor is inserted into the insulation displacement contact section as well as supporting the insulation displacement contact surface laterally. One of the principal advantages of the electrical connector disclosed in U.S. Patent 4,159,158 is that conductors, such as insulated wires, can be mass terminated to a plurality of terminals in a single operation. This mass termination technique greatly simplifies interconnection of the conductors to the terminals and yields a corresponding saving in assembly costs. Although that connector does provide a low cost interconnection system suitable for use in large numbers in the electronics industry, there is an ever increasing need to reduce both the material costs and the assembly costs for interconnection systems between individual insulated conductors and contact elements such as terminal posts located on closely spaced centerlines.

The corresponding need to reduce material costs, to reduce assembly costs, and to maintain closely spaced centerlines between terminals in the multicontact connector are generally contradictory. For example, the connector depicted in U.S. Patent 4,062,610 can be used to mass terminate conductors in a housing on closely spaced centerlines. However, the fabrication of the contact terminal, its plating, and the amount of material needed in the fabrication of the terminal can be relatively expensive. Similarly, the connector disclosed in U.S. Patent 4,385,794, while exhibiting a number of advantages which have made this connector a highly successful interconnection system, does employ a large amount of material to fabricate the connector terminal.

Contacts of the type shown in U.S. Patent 4,385,794, and of the type involved in the instant invention are arranged in dense arrays of closely spaced terminals typically having centerline spacings of 2.54 mm (0.100 inches) between adjacent terminals. The wire used on this type spacing is typically 22—28 gauge with the diameter of the insulation approximately 1.27 mm (.050 inches). Therefore, the formed width of the contacts must, per se, be greater than 1.27 mm (.050 inches) but

less than 2.54 mm (0.100 inches). Contacts of this size are typically left on the carrier strip after being stamped and formed as the contacts are easier to handle while connected to the carrier strip. Once all contacts are inserted into the respective cavities, the carrier strip may be cut off leaving all contacts in place within the connector. In order to simplify the manufacturing and assembling costs involved, it is preferable to have a contact which, in the flat blank stage, is also less than the centerline spacing of the connector cavities, in this case, less than 2.54 mm (0.100 inches). If this design is achieved, all of the contacts can be loaded within the housing cavities from a single carrier strip. If the width of the contact, in the flat blank stage, is greater than the centerline spacing of the connector cavities, the contacts could not be loaded into the connector cavities from a single carrier strip, because the centerline spacings of the formed contacts could not possibly be on the centerline spacing of the connector cavities.

Referring again to the contact disclosed in U.S. Patent 4,385,794, and more specifically to its Figure 1, it is apparent from the box type receptacle portion 16, that the unfolded width of the flat stamping is wider than the centerline spacing of the contacts. Therefore, the installation of the contacts is made more difficult as more than one carrier strip is required to load all contacts within the housing. Although a connector of the type shown in U.S. Patent 4,435,035 can be employed with a mass termination technique in which conductors are inserted into the insulation displacement terminals while the terminals are fully inserted into the housing, centerline spacing for which this operation can be accomplished may be limited, and this connector does employ a large amount of material to form the terminal.

A connector having an insulation displacement slot formed by stamped metal forming two upstanding plates interconnected by a bight portion is shown in U.S. Patent 4,335,929. Although this connector does allow close centerline spacing between adjacent terminals in the same connector, the terminals U-portion in the 4,335,929 Patent is relatively high as the wire terminating slot must be long enough to accommodate a conductor and allow good electrical connection, and a terminal of this height does not allow lateral stacking with adjacent connectors and maintain 2.54 mm (0.100 inches) lateral spacing between centers.

A terminal is disclosed in U.S. Patent 4,527,857 which utilizes an insulation displacement slot at one end and folded arms at the opposite end to contact blade type terminals. However, this contact could not be used to contact posts on a square matrix.

As shown in Figure 1, the contact has two pairs of parallel and opposed contacts for contacting a blade terminal. As blade terminals are longer than 2.54 mm (0.100 inches), the terminals shown in U.S. Patent 4,527,857 could not be utilized for a 2.54 mm (0.100 inch) square matrix.

The connector disclosed herein not only achieves the excellent performance exhibited by these former interconnection systems but also offers even lower cost interconnection system by significantly reducing the amount of material which must be used to fabricate the contact terminal, by facilitating plating on only a single surface of the stamped terminal blank, and by providing an insulating housing which can be positioned side by side and end to end with similar contact housing assemblies to form an interconnection system between contact elements, such as terminal posts located on closely spaced centers in a multidimensional array.

The present invention consists in an electrical connector as set forth in Claim 1 hereof.

One embodiment of the invention comprises an electrical connector assembly for establishing an insulation displacement contact between a plurality of insulated conductors and a fixed array of closely spaced contact elements, such as terminal posts or pins located in an array of pins on a 2.54 mm (0.100 inch) square matrix. This connector includes an insulative housing and a plurality of individual terminals stamped and formed and then positioned within cavities extending at least partially through the insulative housing, and each terminal has a spring contact portion engagable with the terminal posts and a separate insulation displacement portion for use in establishing contact with the individual conductors, such as insulated wires. The insulation displacement portion comprises a U-shaped member defined by two upstanding plate members and a continuous bight portion therebetween. The slot is stamped into the U-shaped member at a direction which is transverse to the plane of the plates. Finger portions which lie in the plane of the plates but separated from the strap portions forming the bight portion are disposed adjacent to the slot in the plates and have edges aligned with the edges of the slot in the plates, effectively increasing the slot length without increasing the overall envelope of the terminal. The spring contact portion of the terminal is formed by two bifurcated members also extending generally axially. These bifurcated members are formed upwardly and are twisted such that contact surfaces formed on each bifurcated member are inwardly facing and in opposed relationship, in a position to engage terminal posts on sides between adjacent terminal posts. The width of the terminals and the bifurcated contact portion is no greater than the width of the contact terminals in the insulation displacement portion. Furthermore, the width of the flat stamped blank is no wider than the width of the formed terminal. Both the insulation displacement portion and the contact portion are formed upwardly from the base of the terminal to permit a conductor to be inserted laterally of its axis into the wire engaging slot while the terminal is fully positioned within the insulative housing and, furthermore, to permit the bifurcated members forming the contact portion to engage posts or pins centrally positioned within the housing.

An embodiment of the invention will now be

described by way of example with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of vertical and horizontal mounted pin grid array connectors, positioned for insertion into vertical and horizontal pin headers;

Figure 2 is a plan view, partially in section, of the preferred embodiment of this invention showing a single terminal inserted into the insulative housing;

Figure 3 is a sectional view taken along section 3—3 of Figure 2, showing a sectional view of an individual terminal mounted in the housing;

Figure 4 is a perspective view of a single terminal in accordance with the preferred embodiment of this invention;

Figure 5 is a perspective view, partially in the section, showing the mass termination of a plurality of round conductors in a multicontact terminal in accordance with the preferred embodiment of this invention;

Figure 5A is a view similar to Figure 5 showing the withdrawal of the insertion apparatus and showing the conductors attached to terminals in the multicontact electrical connector comprising the preferred embodiment of this invention;

Figure 6 is a sectional view through lines 6—6 of Figure 5A showing an insulation displacement contact with an insulated wire;

Figure 7 is a sectional view through lines 7—7 of Figure 5A of the crimped strain relief established by the terminal comprising the preferred embodiment of this invention;

Figure 8 is a cross-sectional view through the bight portion of the terminal;

Figure 9 is a cross-sectional view through the bight portion of a representative prior art terminal;

Figure 10 is an enlarged view of the insulation displacement portion shown in Figure 3;

Figure 10A is a cross-sectional view through the lines 10A—10A of Figure 9;

Figure 11 is similar to that of Figure 8 showing a wire terminated having thick insulation;

Figure 12 is a view of a stamped blank in accordance with the preferred embodiment.

The preferred embodiment depicted herein comprises a multicontact electrical connector having a plurality of terminals forming an interconnection between individual conductors, such as insulated wires, and contact elements, such as terminal posts, positioned in a closely spaced array. For example, this closely spaced array of contact elements or terminal posts can be positioned in a square matrix in which adjacent posts or pins in each row and column are spaced apart by a distance on the order of 2.54 mm (0.100 inches). It should also be understood that the instant invention can also be employed for interconnecting conductors to posts having centerline spacings greater than or less than this standard centerline spacing. Furthermore, the connector assembly depicted herein can be employed for use in terminating bare conductors or can be used for terminating flat conductors included in a multiconductor flat cable, or can be used to terminate round

conductors in a ribbon cable. This invention is not limited to use in terminating individual insulated round wires to the terminal post. Furthermore, this invention is especially adaptable for use in electrical connectors in which a varying number of conductors can be employed. For instance, this invention is amenable to use with a single position electrical connector and is also suitable for use in a connector having many more positions than the six-position connector depicted herein.

As shown in Figure 1, the connector assembly comprises a plug member 2 containing a plurality of terminals 12 for use in establishing electrical contact with contact elements such as terminal posts or pins 11, shown here in a pin header 4. Figure 1 discloses two plug connectors 2 and 2a, both of which are identical. Figure 1 also demonstrates that the same plug header can be used for interconnecting terminal posts 11 extending horizontally relative to the surface of a printed circuit board 6, or the same connector, here shown as connector 2a, can be used to establish an interconnection with posts 11a extending vertically relative to the printed circuit board 6. Although this invention is adaptable for use with free standing contact elements or terminal posts 11 or 11a, it is especially adapted for use in conjunction with a pin header, such as the horizontal pin header 4 and the vertical pin header 4a shown in Figure 1. Thus the connector assembly depicted in Figure 1 comprises a means for interconnecting a plurality of conductors, such as insulated round wire conductors 10 and 10a, to a plurality of terminals posts 11 and 11a which in turn can be used to interconnect the conductors to conductive paths 8 and 8a located on the surface of a printed circuit board 6.

The terminal 12 comprising the preferred embodiment of this invention is depicted in Figure 4, and comprises a stamped and formed electrical terminal having an insulation displacement section or portion 92 and a contact or pin-engaging section or portion 90. In the preferred embodiment of this invention, the contact terminals are stamped from a blank having a width less than the spacing between adjacent pins for which the interconnector is to be made. The width of the contact terminal blank, as shown in Figure 12 is essentially constant along the length of the terminal and the width of the contact or pin element engaging section 90 is no greater than the width of the insulation displacement section 92. Furthermore, the width of the flat stamping (Figure 12) is no wider than the formed terminal (Figure 4). It can be appreciated from Figure 2, Figure 4, and Figure 12 that the width of the insulation displacement section 92 and the contact or pin-engaging section 90 in the stamped and formed blank must be less than the spacing between adjacent pin-engaging elements. The width of the contact terminals is also less than the centerline spacing between adjacent cavities and channels in the insulative housing.

The contact terminal 12 is stamped from a spring metal, such as brass. Conventional plat-

ings such as tin lead plating or gold plating are typically applied to the terminal to present a mill finish surface to the mating pin. As will be apparent from a discussion of the configuration of the terminal, the terminal 12 can be plated, in the vicinity of the contact surfaces which engage the contact elements or pins, by merely selectively plating only one surface of the stamped contact before the contact is formed to its final configuration or by plating only a portion of the stamped metal blank. This ability to selectively plate only one surface can significantly reduce the cost of expensive plating, such as gold.

As shown in Figure 4, the insulation displacement section 92 of the contact terminal 12 shown in Figure 4 comprises an axially extending conductor or wire-receiving slot, shown generally as 20, intermediate the ends of the terminal and adjacent a wire retention portion comprising tabs 14a and 14b located on one end of the terminal. The tabs 14a and 14b are formed by removing material in the center of the stamped blank and forming the tabs 14a and 14b upwardly so that they extend generally perpendicular to a flat base portion 16 originally in the plane of the stamped member. The wire receiving or wire displacement slot 20 comprises a means for forming an electrical contact to an insulated conductor upon movement of the insulative conductor laterally of its axis, and includes conductor contacting edges 22, which are formed in two upstanding plate portions 18a and 18b. The two plate portions 18a and 18b are connected by an intermediate bight portion comprising segments 19a and 19b. As shown in Figure 3, the wire receiving slot 20 comprises a first section 20b in plate section 18a, a second section 20a between segments 19a and 19b and a third slot section 20c extending into plate portion 18b. The ends of each slot 20 extend into a portion of the flat section 16 which is in the original plane of the stamped blank and into a central base portion 24, also in the original plane of the flat blank. Thus the length of the slot is greater than the height of the plate portions 18a and 18b. The section of the slot 20a between the bight segments formed by 19a and 19b is generally wider than the conductor 50 forming the core of the insulated conductor.

A cross-sectional view of an insulation displacement portion of a prior art terminal is shown in Figure 9 with an effective slot length of L' . An insulation displacement slot should only lie in the plane of the plate portions, or in the plane of plates 18a', 18b', of Figure 10A, and not into the radiused portion. In forming a terminal as shown in Figure 10A, the minimum radius R which can be formed is limited to the diameter of the material thickness, thereby precluding any surface cracking at the outer surface of the radiused portion. Furthermore, the insulation displacement slot requires a lead-in portion such as 54', as shown in Figure 9 to assist in shearing the insulation exposing the conductor in order to terminate the conductor within the insulation displacement slot. In the light of the above con-

siderations, minimum radius and required lead-in portion, the effective or usable contacting portion of an insulation displacement slot is thereby reduced. As shown in Figure 10A, the usable contacting portion of the prior art slot is reduced to L', which is well below the underside surface 21 of portions 19a, 19b.

However, in the instant invention, the insulation displacement portion 92 further includes finger portions 55 extending contiguously with the plate portions 18a, 18b and upstanding in the same plane as the plate portions 18a, 18b. As best shown in Figure 10, as the strap portions which form the bight segments 19a, 19b are bent relative to the plate portions 18a, 18b and relative to the finger portions 55, the radius R does not affect the usable portion of the slot. Without increasing the overall height of the terminal itself, the usable portion of the slot is now be increased to L, which is well above the underside surface 21 of the segments 19a, 19b. The insulation displacement slot can still include a lead-in portion 54 without substantially reducing the usable contacting portion of the slot.

The finger portions 55 further include radiused portions 57 which first contact the insulation upon insertion of the wire into the slot 20, thereby assisting in initially piercing through the insulation. The finger portions 55 also include beveled surfaces 61 (Figure 10) which further assist in piercing through the insulation. If a wire is terminated having a large amount of insulation, as shown in Figure 11, the insulation fills in radiused portion and produces a normal force on surface 63, thereby increasing the force between the plate edges 22 and the conductor and the integrity of the electrical connection.

The engagement of the slot edges 22 with the conductor is shown most clearly in Figure 6. Since the ends of the slots 20b and 20c extend not only through the plate-like portions 18a and 18b but into the flat base portions 16 and 24 (Figure 3), the conductor 50 can be inserted into slots 20b and 20c to a point in which the insulation 52 engages the base portions of the terminal. Thus the insulation displacement portion of the preferred embodiment of the terminal disclosed herein comprises a low profile member suitable for use with closely spaced connector housings. Furthermore, the extension of the slot into the base portion 16 and 24 serves to increase the elastic deflection which can be achieved with this connector configuration, thus permitting the terminal to be used with wires having different diameters or different gauges.

The central base portion 24 of contact terminal has a flange 25 deflected laterally outward from the plane of the base portion 24, which remains in the original plane of the stamped blank when the terminal configuration is formed. The central base portion 24 is positioned intermediate the insulation displacement portion 92 located on the conductor engaging end of the terminal and the rear or mating end of the terminal 90. This rear or mating end of the terminal 90 comprises a contact

element or pin engaging section and consists of bifurcated members having inclined sections 26a and 26b and arms on which opposed contact surfaces 34a and 34b are defined. Each of these bifurcated members is defined by an axially extending second slot 36 (Figure 4) generally in alignment with slot 20. The arms and the contact surfaces 34a and 34b defined thereon are positioned intermediate the height of the contact terminal. The inclined sections 26a and 26b are formed during the contact fabrication operation such that opposed contact surfaces 34a and 34b are centrally disposed relative to the slots 20 and are positioned such that contact surfaces 34a and 34b can engage the sides of contact pins. As shown most clearly in Figure 4, the arms consist of first sections 28a and 28b which are generally parallel to and spaced from the base portion 24. A twist 30a and 30b is formed intermediate the ends of the arms such that second sections 32a and 32b extend generally perpendicular to the base portion 24 and perpendicular to the original plane of the stamped blank from which the terminal is formed. The contact surfaces 34a and 34b are formed in these transverse or perpendicularly extending sections of the arms and are radiused such that the contact surfaces 34a and 34b are more closely spaced in opposing relationship than the remaining sections of the bifurcated members. The bifurcated members thus form a resilient contact with the terminal pins upon insertion of the terminal pins in between the contact surfaces 34a and 34b. The bifurcated members flex generally about the root of the second slot 36 stamped to define the two bifurcated members.

The contact surfaces 34a and 34b which are laterally opposed when the contact terminal is stamped are initially formed on the same surface of the contact terminal. Thus if the stamped terminal or the blank is plated on one surface in the vicinity of the contact surfaces 34a and 34b, both opposed surfaces 34a and 34b will be plated when the terminal is subsequently formed in the manner shown in Figure 4.

As shown in Figure 2 and in Figure 3, the contact terminal 12 can be inserted into a cavity formed between opposite ends of a multicontact insulating connector housing 40. These cavities which extend from end to end in the housing 40 consist of a first channel 42 which is open on one face and an enclosed cavity 44 merging with and axially aligned with each channel 42. The enclosed cavities 44 are dimensioned to receive the contact element or pin-engaging section 90 of the corresponding contact terminals, while the open-faced channels 42 are adapted to receive the insulation displacement portion 92 of the terminal 12. The flange 25 and the central base portion 24 of the terminal is received within a recess in the insulative housing to engage the shoulder which prevents the terminal from being removed after insertion. The insulation displacement portion 92 of the terminal and its slot 20 are located in the channel 42, each channel being defined by two

opposed sidewalls and a base. Thus the slot 20 is exposed for subsequent insertion of a conductor laterally of its axis and laterally of the axis of the channel 42 into the slot 20. The portion of the channel 42 adjacent the furthestmost end of the housing is wider than the remaining portion of this housing. The wire retention tabs 14a and 14b are positioned in this wider section of the housing as is apparent in Figure 2. The coaxial closed end cavity 44 has a height which is less than the height of the channel 42, as can be seen in Figure 3. The mating end of the insulating housing in which the closed-in cavity 44 is defined is generally thinner than the conductor engaging end of the housing in which the insulation displacement portion of the terminal is located. This thinner mating section thus provides room for an elongate ridge 48 defined along a portion of the mating end of the housing and having a thickness no greater than the thickness of the conductor engaging section, as can be seen quite clearly in Figure 3. Furthermore, a retention tab 48 can be defined on the surface of the mating end of the housing opposite from the position of ridge 48. By providing a thinner mating section, the retention member 48 and the keying ridge 46 can both be integrally defined on the exterior of the housing and the total thickness of the housing will not be increased by virtue of the presence of the retention tab 48 and the keying ridge 46.

Figures 5 and 5A demonstrate the manner in which a plurality of insulated conductors can be mass terminated into the terminals 12. As shown in Figure 5, a multiposition inserter member 70 comprising a crimping section 74 and an insulation displacement insertion section 72 can be positioned in registry with the insulation displacement portions 92 of the terminals 12 in the housing 40 of connector 2. The crimping section 74 can be positioned in alignment with the retention tabs 14a and 14b of the terminal while the inserter member 70 can be positioned in registry with the slots 20 defined in the terminals 12.

Thus upon movement of the inserter towards the terminals, and subsequent movement of the conductors laterally of their axis and into the channels, a plurality of conductors 10 can be simultaneously mass terminated to insulation displacement slots 20 in individual aligned terminals 12. Furthermore, the retention tabs 14a and 14b can be crimped around the exterior of the conductor, as shown in Figure 7, to retain the conductors in electrical contact with slot 20. Figure 5A illustrates the insulation displacement contact formed by each terminal on the corresponding conductor 10. Note that the conductors are terminated with the terminals fully inserted into the insulated housing, thus precluding the additional step of fully inserting the terminals after wire termination. Note that the wider portion of the channel 42 adjacent the free end of the insulative housing provides clearance into which the crimping section of the inserter 70 can enter to deform tabs 14a and 14b about the conductor.

After the conductors have been terminated to their respective terminals in the manner shown in Figures 5 and 5A, the individual plug connector 2 can be inserted into a pin header housing 4 or 4a in the manner shown in Figure 1. Note that the horizontal pin header 4 and the vertical pin header 4a each define a compartment 13 and 13a respectively into which the pins 11 and 11a respectively extend. Slots 15 and 17 are formed into one wall of the pin header 4. Similarly slots 15a and 17a are also formed into a wall of the vertical pin header 4a. These slots 15 and 17 and 15a and 17a respectively are dimensioned to receive the keying ridges 46 located on one surface of the plug connector housing 40. In the preferred embodiment of this invention, a plurality of ridges 46 could be arbitrarily positioned on one surface of the connector housing, thus ensuring that only a mating plug and receptacle housing could be mated, assuring that appropriate conductors are interconnected to appropriate contact elements or pins 11. Note that in the embodiment shown in Figure 1 each of the receptacles has two ridges 46 and each of the pin header receptacle housings has two grooves 15a and 17a to serve as keying means.

The preferred embodiment of this invention is especially adapted to allow a mass termination interconnection between a plurality of conductors and closely spaced terminal pins in a pin grid array on a 2.54 mm (0.100 inch) centerline square matrix. The opposed contact surfaces 34a and 34b are twisted intermediate their length allowing resilient contact with very little material, further allowing close spacing between adjacent contacts. As the finger portions 55 effectively extend the slot length without raising the height of the terminal, the connectors can be stacked laterally side-to-side on a 2.54 mm (0.100 inch) centerline.

As the flat blank stamping is no wider than the centerline spacing of the contacts and no wider than the formed terminal, the contact is very efficient with respect to the quantity of material used. Previous prior art terminals used twice as much material to accomplish the same objective.

In addition to using less material providing a substantial cost savings, the design of the flat blank having contacts narrower than the centerline spacing between the contacts allows all of the contacts to remain on one carrier strip after they are formed with centerline spacing of 2.54 mm (0.100 inches). This design provides for an easier and a more efficient assembly operation in that only one carrier strip must be handled by an automatic assembly machine which inserts the contacts into the housing. On previous prior art contact designs the flat stamping of the contact was wider than the centerline spacing between the contacts, requiring a plurality of carrier strips being handled by the automatic assembly machine. An automatic assembly machine for installing two carrier strips is more complex and costly than the automatic assembly machine which inserts one carrier

strip, as the contacts must be stamped on 5.08 mm (0.200 inch) centerlines and then overlapped to give a centerline spacing of 2.54 mm (0.100 inches).

The connector design also allows mass termination of all wires with the contacts fully loaded. As the connector housing is designed with apertures exposing the insulation displacement portions, the individual wires of multi-conductor cable or ribbon cable can be mass inserted with the contacts fully loaded as shown in Figures 5 and 5A.

Claims

1. An electrical connector for interconnecting electrical conductors, the connector comprising:
at least one terminal (12) disposed in a housing (40), the or each terminal (12) having an insulation displacement portion (92) comprising plate means (18a, b) having an adjacent and contiguous radiused portion, and a conductor receiving slot (20) profiled to terminate a conductor (50) of an insulated wire (10), the connector being characterized in that:

the insulation displacement portion (92) of the or each terminal (12) includes finger portions (55) separated from said radiused portion, lying substantially in the plane of said plate means (18a, b) and adjacent to the radiused portion flanking the conductor receiving slot (20), the finger portions (55) having edges aligned with edges (22) of the conductor receiving slot (20) extending the slot above the intersection between the radiused portion and the plate means (18a, b) effectively increasing the slot length without increasing the envelope of said terminal (12).

2. The connector of claim 1 characterized in that the or each terminal (12) further comprise a normal force contact portion (90) including two arms (28a, 28b) radially twisted about an axial centerline of said arms (28a, 28b) to form opposed members (32a, 32b) having surfaces in opposed relationship with one another.

3. The connector of claim 1 or 2 characterized in that the plate means comprise first (18a) and second (18b) substantially parallel plates having a bight portion (19a, 19b) therebetween, the plates (18a, 18b) and bight portion (19a, 19b) being continuous at radiused portions.

4. The connector of claim 1, 2 or 3, characterized in that the or each terminal (12) further comprises a relief area (59) disposed between a finger portion (55) and said radiused portion for receiving therein insulation (52) of an insulated wire (10), said relief area (59) comprising a recess in the plate means (18a, b) at the separation of the plate means and finger portion (55).

5. The electrical connector of claim 3, characterized in that the slot (20) is formed by parallel and opposed sheared edges (22) extending from an end of each plate (18a, 18b) and upwards through each plate (18a, 18b) and into the finger portions (55).

6. The electrical connector of claim 5, charac-

terized in that the length of the slot (20) formed by said sheared edges is longer than the distance between the end of each plate (18a, 18b) and a point of tangency at the intersection of the plates (18a, 18b) and said radiused portions.

7. The connector of claim 1 characterized in that the or each terminal (12) is formed from a stamped metal blank having substantially linear and parallel side edges extending between the two ends of the stamped metal blank, the stamped metal blank having a width no greater than the centerline spacing between adjacent cavities (44) of the housing (40), the conductor receiving slot (20) extending axially through two upstanding plate portions (18a, b) formed upwardly from the plane of the blank and joined by an intermediate bight portion (19a, 19b), and the plate portions (18a, b) and the bight portion extending between the side edges of the blank, and further characterized in that a contact portion comprises bifurcated members, each bifurcated member having a twisted section (30a, b) intermediate the ends thereof, the portion (32a, b) of the bifurcated members between the twisted section (30a, b) and the adjacent end being spaced from the sides of the cavities (44), the conductor receiving slot and the bifurcated members being oriented relative to each respective channel (42) and cavity (44) of housing (40) to exert opposed residual stresses between adjacent conductors (50) and pins (11) respectively, the side edges of the terminal (12) between the twisted section and the end adjacent the conductor receiving slot (20) engaging the channel sidewalls and the cavity sides whereby the terminals (12) are pre-loaded into the housing (40) and a plurality of conductors (50) are simultaneously mass terminated by moving the conductors (50) laterally of the terminals (12) into the conductor receiving slots (20).

8. The electrical connector of claim 7 characterized in that opposed contact surfaces (34a, 34b) are formed between the twisted sections (32a, 32b) and the adjacent terminal end.

9. An electrical connector for interconnecting a plurality of conductors (50) to a like plurality of pins (11) located in a closely spaced fixed array in at least one row, comprising:

a plurality of terminals (12), each formed from a stamped metal blank, each terminal having an insulation displacement portion (92) adjacent one end and a resilient pin contact portion (90) adjacent the opposite end, comprising two twisted bifurcated members; and

an insulative housing (40) having a plurality of cavities (44);

the electrical connector being characterized in that the housing (40) has a pin receiving end and a conductor receiving end, each cavity (44) communicating with an open channel (42) at the conductor receiving end, each channel (42) being defined by a base, two opposed sidewalls and an open face opposed to the base, the open face of each channel (42) being located on one side of the housing (40);

strip, as the contacts must be stamped on 5.08 mm (0.200 inch) centerlines and then overlapped to give a centerline spacing of 2.54 mm (0.100 inches).

The connector design also allows mass termination of all wires with the contacts fully loaded. As the connector housing is designed with apertures exposing the insulation displacement portions, the individual wires of multi-conductor cable or ribbon cable can be mass inserted with the contacts fully loaded as shown in Figures 5 and 5A.

Claims

1. An electrical connector for interconnecting electrical conductors, the connector comprising:
at least one terminal (12) disposed in a housing (40), the or each terminal (12) having an insulation displacement portion (92) comprising plate means (18a, b) having an adjacent and contiguous radiused portion, and a conductor receiving slot (20) profiled to terminate a conductor (50) of an insulated wire (10), the connector being characterized in that:

the insulation displacement portion (92) of the or each terminal (12) includes finger portions (55) separated from said radiused portion, lying substantially in the plane of said plate means (18a, b) and adjacent to the radiused portion flanking the conductor receiving slot (20), the finger portions (55) having edges aligned with edges (22) of the conductor receiving slot (20) extending the slot above the intersection between the radiused portion and the plate means (18a, b) effectively increasing the slot length without increasing the envelope of said terminal (12).

2. The connector of claim 1 characterized in that the or each terminal (12) further comprise a normal force contact portion (90) including two arms (28a, 28b) radially twisted about an axial centerline of said arms (28a, 28b) to form opposed members (32a, 32b) having surfaces in opposed relationship with one another.

3. The connector of claim 1 or 2 characterized in that the plate means comprise first (18a) and second (18b) substantially parallel plates having a bight portion (19a, 19b) therebetween, the plates (18a, 18b) and bight portion (19a, 19b) being continuous at radiused portions.

4. The connector of claim 1, 2 or 3, characterized in that the or each terminal (12) further comprises a relief area (59) disposed between a finger portion (55) and said radiused portion for receiving therein insulation (52) of an insulated wire (10), said relief area (59) comprising a recess in the plate means (18a, b) at the separation of the plate means and finger portion (55).

5. The electrical connector of claim 3, characterized in that the slot (20) is formed by parallel and opposed sheared edges (22) extending from an end of each plate (18a, 18b) and upwards through each plate (18a, 18b) and into the finger portions (55).

6. The electrical connector of claim 5, charac-

terized in that the length of the slot (20) formed by said sheared edges is longer than the distance between the end of each plate (18a, 18b) and a point of tangency at the intersection of the plates (18a, 18b) and said radiused portions.

7. The connector of claim 1 characterized in that the or each terminal (12) is formed from a stamped metal blank having substantially linear and parallel side edges extending between the two ends of the stamped metal blank, the stamped metal blank having a width no greater than the centerline spacing between adjacent cavities (44) of the housing (40), the conductor receiving slot (20) extending axially through two upstanding plate portions (18a, b) formed upwardly from the plane of the blank and joined by an intermediate bight portion (19a, 19b), and the plate portions (18a, b) and the bight portion extending between the side edges of the blank, and further characterized in that a contact portion comprises bifurcated members, each bifurcated member having a twisted section (30a, b) intermediate the ends thereof, the portion (32a, b) of the bifurcated members between the twisted section (30a, b) and the adjacent end being spaced from the sides of the cavities (44), the conductor receiving slot and the bifurcated members being oriented relative to each respective channel (42) and cavity (44) of housing (40) to exert opposed residual stresses between adjacent conductors (50) and pins (11) respectively, the side edges of the terminal (12) between the twisted section and the end adjacent the conductor receiving slot (20) engaging the channel sidewalls and the cavity sides whereby the terminals (12) are pre-loaded into the housing (40) and a plurality of conductors (50) are simultaneously mass terminated by moving the conductors (50) laterally of the terminals (12) into the conductor receiving slots (20).

8. The electrical connector of claim 7 characterized in that opposed contact surfaces (34a, 34b) are formed between the twisted sections (32a, 32b) and the adjacent terminal end.

9. An electrical connector for interconnecting a plurality of conductors (50) to a like plurality of pins (11) located in a closely spaced fixed array in at least one row, comprising:

a plurality of terminals (12), each formed from a stamped metal blank, each terminal having an insulation displacement portion (92) adjacent one end and a resilient pin contact portion (90) adjacent the opposite end, comprising two twisted bifurcated members; and

an insulative housing (40) having a plurality of cavities (44);

the electrical connector being characterized in that the housing (40) has a pin receiving end and a conductor receiving end, each cavity (44) communicating with an open channel (42) at the conductor receiving end, each channel (42) being defined by a base, two opposed sidewalls and an open face opposed to the base, the open face of each channel (42) being located on one side of the housing (40);



side edges of the stamped blank being substantially linear and parallel between the ends thereof, the stamped blank having a width no greater than the centerline spacing between adjacent cavities (44) and channels (42); and

the insulation displacement portion (92) on each terminal (12) being located in a respective channel (42) with the resilient pin contact portion (90) being positioned within the corresponding cavity (44), the insulation displacement portion (92) in the channel (42) being oriented to receive a conductor (50), inserted laterally of the axis of the terminal (12), into the insulation displacement portion (92) and into the channel (42), the insulation displacement portion (92) and the bifurcated members being oriented relative to each respective channel (42) and cavity (44) to exert opposed residual stresses between adjacent conductors (50) and pins (11) respectively, whereby the terminals (12) are pre-loaded in the cavities (44) in corresponding channels (42) and a plurality of conductors (50) are simultaneously mass terminated by moving the wires (10) laterally of the terminals (12) into the insulation displacement portions (92).

10. The electrical connector of claim 9 characterized in that the bifurcated members have twisted sections (30a, 30b) intermediate their ends, the side edges of the terminals (12) between the insulation displacement portion (92) and the twisted sections (30a, 30b) engaging sidewalls of the channels (42) in cavities (44) respectively, the remaining portion of the bifurcated members between the twisted sections (30a, 30b) and the other end being spaced from the sidewalls of the cavity (44), said remaining portion comprising opposed active spring members.

Patentansprüche

1. Elektrischer Verbinder zum Verbinden von elektrischen Leitern, wobei der Verbinder aufweist:

mindestens einen Anschluß (12), der in einem Gehäuse (40) angeordnet ist, wobei der oder jeder Anschluß (12) einen Isolationsverdrängungsbereich (92) besitzt, der eine Blecheinrichtung (18a, b) aufweist, die einen angrenzenden und ohne Unterbrechung anschließenden, gerundeten Bereich hat und

einen Leiteraufnahmeschlitz (20), der mit einem Profil versehen ist, um einen Leiter (50) eines isolierten Drahtes (10) anzuschließen und wobei der Verbinder dadurch gekennzeichnet ist, daß der Isolationsverdrängungsbereich (92) des oder jedes Anschlusses (12) Fingerbereiche (55) enthält, die von dem gerundeten Bereich getrennt sind und im wesentlichen in der Ebene der Platteneinrichtung (18a, b) und angrenzend zu dem gerundeten Bereich liegen, der den Leiteraufnahmeschlitz (20) flankiert, daß die Fingerbereiche (55) Ränder haben, die mit den Rändern (22) des Leiteraufnahmeschlitzes (20) fluchten und die den Schlitz über die Schnittlinie zwischen dem gerundeten Bereich und der Platteneinrichtung (18a, b)

hinaus erstrecken und dabei die Schlitzlänge effektiv vergrößern ohne die Umhüllende des Anschlusses (12) zu vergrößern.

2. Verbinder nach Anspruch 1, dadurch gekennzeichnet, daß der oder jeder Anschluß (12) einen Normalkraftkontaktbereich (90) aufweist, der zwei Arme (28a, 28b) aufweist, die radial um eine axiale Mittellinie der Arme (28a, 28b) verdreht sind, um einander gegenüberstehende Glieder (32a, 32b) zu bilden, die Flächen haben, die in gegenüberstehender Beziehung zueinander stehen.

3. Verbinder nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß die Platteneinrichtung erste (18a) und zweite (18b), im wesentlichen parallele Platten aufweist, zwischen denen sich ein Bügelbereich (19a, 19b) befindet, wobei die Platten (18a, 18b) und der Bügelbereich (19a, 19b) in gerundeten Bereichen ineinander übergehen.

4. Verbinder nach Anspruch 1, 2 oder 3, dadurch gekennzeichnet, daß der oder jeder Anschluß (12) eine Entlastungsfläche (59) aufweist, die zwischen einem Fingerbereich (55) und dem gerundeten Bereich angeordnet ist, um darin die Isolation (52) eines isolierten Drahtes (10) aufzunehmen, wobei die Entlastungsfläche (59) eine Ausnehmung in der Platteneinrichtung (18a, b) an der Trennstelle zwischen der Platteneinrichtung und dem Fingerbereich (55) aufweist.

5. Elektrischer Verbinder nach Anspruch 3, dadurch gekennzeichnet, daß der Schlitz (20) durch parallele und sich gegenüberliegende Schnittkanten (22) gebildet ist, die sich von einem Ende einer jeden Platte (18a, 18b) aufwärts durch jede Platte (18a, 18b) und hinein in die Fingerbereiche (55) erstrecken.

6. Elektrischer Verbinder nach Anspruch 5, dadurch gekennzeichnet, daß die Länge des Schlitzes (20), der durch die Schnittkanten (22) gebildet wird, länger ist als der Abstand zwischen dem Ende einer jeden Platte (18a, 18b) und einem Tangentialpunkt an der Schnittlinie der Platten (18a, 18b) und der gerundeten Bereiche.

7. Verbinder nach Anspruch 1, dadurch gekennzeichnet, daß der oder jeder Anschluß aus einem Metallstanzrohling geformt ist, der im wesentlichen geradlinige und parallele Seitenränder hat, die sich zwischen den zwei Enden des Metallstanzrohling erstrecken, daß der Metallstanzrohling eine Breite hat, die nicht größer ist als der Mittellinienabstand zwischen benachbarten Hohlräumen (44) des Gehäuses (40), daß der Leiteraufnahmeschlitz (20) sich axial durch zwei aufrecht stehende Plattenbereiche (18a, b) erstreckt, die von der Ebene des Metallstanzrohling aufwärts geformt und durch einen dazwischen liegenden Bügelbereich (19a, 19b) verbunden sind, daß die Plattenbereiche (18a, b) und der Bügelbereich sich zwischen den Seitenrändern des Rohling erstrecken, und weiterhin dadurch gekennzeichnet, daß ein Kontaktbereich gegabelte Glieder aufweist, wobei jedes gegabelte Glied einen zwischen seinen Enden liegenden verdrehten Abschnitt (30a, b) hat, wobei die Bereiche (32a, b) der gegabelten Glieder zwischen dem verdrehten



Abschnitt (30a, 30b) und dem benachbarten Ende, von den Seiten der Hohlräume (44) Abstand haben, wobei der Leiteraufnahmeschlitz und die gegabelten Glieder relativ zu jedem der betreffenden Kanäle (42) und Hohlräume (44) des Gehäuses (40) so ausgerichtet sind, daß zueinander gerichtete Restspannungen zwischen jeweils benachbarten Leitern (50) und Stiften (11) ausgeübt werden, und die Seitenkanten des Anschlusses (12) zwischen dem verdrehten Abschnitt und dem, dem Leiteraufnahmeschlitz (20) benachbarten Ende an den Kanalseitenwänden und den Hohlraumseiten angreifen, wodurch die Anschlüsse (12) unter Vorspannung in das Gehäuse (40) eingesetzt werden und eine Mehrzahl von Leitern (50) gleichzeitig in Massenanschlußtechnik angeschlossen wird, indem die Leiter (10) von der Seite der Anschlüsse (12) her in die Leiteraufnahmeschlitz (20) bewegt werden.

8. Elektrischer Verbinder nach Anspruch 7, dadurch gekennzeichnet, daß zwischen den verdrehten Abschnitten (32a, 32b) und dem benachbarten Anschlußende sich gegenüberliegende Kontaktflächen (34a, 34b) gebildet sind.

9. Elektrischer Verbinder zum Verbinden einer Mehrzahl von Leitern (50) mit einer gleichen Mehrzahl von Stiften (11), die in einer eng beabstandeten festen Anordnung in mindestens einer Reihe untergebracht sind, mit:

einer Mehrzahl von Anschlüssen (12), jeder davon aus einem Metallstanzrohling geformt, wobei jeder der Anschlüsse einen, einem Ende benachbarten Isolationsverdrängungsbereich (92) und einen dem entgegengesetzten Ende benachbarten elastischen Stiftkontaktbereich (90) hat, der zwei verdrehte gegabelte Glieder aufweist;

und einem isolierenden Gehäuse (40), das eine Mehrzahl von Hohlräumen (44) hat;

wobei der elektrische Verbinder dadurch gekennzeichnet ist, daß das Gehäuse (40) ein Stiftaufnahmeende und ein Leiteraufnahmeende hat, und jeder Hohlraum (44) an dem Leiteraufnahmeende mit einem offenen Kanal (42) in Verbindung steht, wobei jeder Kanal (42) durch eine Basis, zwei gegenüberliegende Seitenwände und eine der Basis gegenüberliegende offene Seite festgelegt ist, wobei die offene Seite eines jeden Kanals (42) auf einer Seite des Gehäuses (40) angeordnet ist;

daß Seitenkanten des Stanzrohlings zwischen dessen Enden im wesentlichen geradlinig und parallel sind und der Stanzrohling eine Breite hat, die nicht größer ist als der Mittellinienabstand zwischen benachbarten Hohlräumen (44) und Kanälen (42); und

daß der Isolationsverdrängungsbereich (20) eines jeden Anschlusses (12) in einem zugeordneten Kanal (42) untergebracht ist, wobei der elastische Stiftkontaktbereich (90) innerhalb des dazugehörigen Hohlräume (44) positioniert ist, der Isolationsverdrängungsbereich (92) im Kanal (42) so orientiert ist, daß er einen Leiter (50) aufnimmt, der quer zur Achse des Anschlusses (12) in den Isolationsverdrängungsbereich (20) und in den

Kanal (42) eingeführt wird und der Isolationsverdrängungsbereich (92) und die gegabelten Glieder relativ zu jedem der jeweiligen Kanäle (42) und Hohlräume (44) so ausgerichtet sind, daß sie zueinander gerichtete Restspannungen zwischen den jeweiligen benachbarten Leitern (50) und Stiften (11) ausüben, wodurch die Anschlüsse (12) in den Hohlräumen (44) in dazugehörigen Kanälen (42) vorgespannt sind und eine Vielzahl von Leitern (50) in Massenanschlußtechnik gleichzeitig angeschlossen wird, indem die Drähte (10) von der Seite der Anschlüsse (12) her in die Isolationsverdrängungsbereiche (20) bewegt werden.

10. Elektrischer Verbinder nach Anspruch 9, dadurch gekennzeichnet, daß die gegabelten Glieder verdrehte Abschnitte (30a, 30b) zwischen ihren Enden haben, daß die Seitenkanten der Anschlüsse (12), die zwischen dem Isolationsverdrängungsbereich (92) und den verdrehten Abschnitten (30a, 30b) liegen mit jeweiligen Seitenwänden der Kanäle (42) in Hohlräumen (44) in Eingriff stehen,

daß die verbleibenden Bereiche der gegabelten Glieder zwischen den verdrehten Abschnitten (30a, 30b) und dem anderen Ende von den Seitenwänden des Hohlraumes (44) Abstand haben und

daß die verbleibenden Bereiche einander gegenüberliegende aktive Federglieder aufweisen.

Revendications

1. Connecteur électrique pour l'interconnexion de conducteurs électriques, le connecteur comprenant:

au moins une borne (12) disposée dans un boîtier (40), la ou chaque borne (12) ayant une partie (92) de déplacement d'isolant comprenant des moyens à plaques (18a, b) ayant une partie arrondie adjacente et contigüe, et une fente (20) de réception de conducteur profilée pour terminer un conducteur (50) d'un fil isolé (10), le connecteur étant caractérisé en ce que:

la partie (92) de déplacement d'isolant de la ou de chaque borne (12) comprend des parties de doigt (55) séparées de ladite partie arrondie, s'étendant sensiblement dans le plan desdits moyens à plaques (18a, b) et adjacentes à la partie arrondie bordant la fente (20) de réception de conducteur, les parties de doigt (55) ayant des bords alignés avec des bords (22) de la fente (20) de réception de conducteur et prolongeant la fente au-dessus de l'intersection entre la partie arrondie et les moyens à plaques (18a, b), augmentant on fait la longueur de la fente sans augmenter l'enveloppe de ladite borne (12).

2. Connecteur selon la revendication 1, caractérisé en ce que la ou chaque borne (12) comprend en outre une partie (90) de contact à force normale comprenant deux bras (28a, 28b) torsadés radialement autour d'un axe central desdits bras (28a, 28b) pour former des éléments opposés (32a, 32b) ayant des surfaces opposées l'une à l'autre.



3. Connecteur selon la revendication 1 ou la revendication 2, caractérisé en ce que les moyens à plaques comprennent des première (18a) et seconde (18b) plaques sensiblement parallèles ayant une partie coudée (19a, 19b) entre elles, les plaques (18a, 18b) et la partie coudée (19a, 19b) étant continues aux parties arrondies.

4. Connecteur selon la revendication 1, 2 ou 3, caractérisé en ce que la ou chaque borne (12) comprend en outre une zone de soulagement (59) disposée entre une partie de doigt (55) et ladite partie arrondie pour recevoir en elle un isolant (52) d'un fil isolé (10), ladite zone de soulagement (59) comprenant un évidement dans les moyens à plaques (18a, b) à la séparation des moyens à plaques et de la partie de doigt (55).

5. Connecteur électrique selon la revendication 3, caractérisé en ce que la fente (20) est formée par des bord cisailés parallèles et opposés (22) s'étendant à partir d'une extrémité de chaque plaque (18a, 18b) et vers le haut à travers chaque plaque (18a, 18b) et jusque dans les parties de doigt (55).

6. Connecteur électrique selon la revendication 5, caractérisé en ce que la longueur de la fente (20) formée par lesdits bords cisailés est plus grande que la distance comprise entre l'extrémité de chaque plaque (18a, 18b) et un point de tangence à l'intersection desdites plaques (18a, 18b) et desdites parties arrondies.

7. Connecteur selon la revendication 1, caractérisé en ce que la ou chaque borne (12) est formée à partir d'un flan de métal découpé ayant des bords latéraux sensiblement linéaires et parallèles s'étendant entre les deux extrémités du flan de métal découpé, le flan de métal découpé ayant une largeur qui n'est pas supérieure à l'entraxe de cavités adjacentes (44) du boîtier (40), les fentes (20) de réception de conducteurs s'étendant axialement à travers deux parties de plaques montantes (18a, b) formées vers le haut à partir du plan du flan et reliées par une partie coudée intermédiaire (19a, 19b), et les parties de plaques (18a, b) et la partie coudée s'étendant entre les bords latéraux du flan, et en outre caractérisé en ce qu'une partie de contact comprend des éléments de fourche, chaque élément de fourche ayant une partie torsadée (30a, b) entre ses extrémités, la partie (32a, b) des éléments de fourche entre la partie torsadée (30a, b) et l'extrémité adjacente étant espacée des côtés des cavités (44), la fente de réception de conducteur et les éléments de fourche étant orientés par rapport à chaque canal respectif (42) et chaque cavité respective (44) du boîtier (40) afin d'exercer des contraintes résiduelles opposées entre des conducteurs (50) et des broches (11) respectivement adjacents, les bords latéraux de la borne (12) entre la partie torsadée et l'extrémité adjacente à la fente (20) de réception de conducteur portant contre les parois latérales du canal et les côtés de la cavité de manière que les bornes (12) soient préchargées dans le boîtier (40) et plusieurs conducteurs (50) soient terminés simultanément en masse par déplacement des conducteurs (50) latéralement

aux bornes (12) vers l'intérieur des fentes (20) de réception de conducteurs.

8. Connecteur électrique selon la revendication 7, caractérisé en ce que des surfaces de contact opposées (34a, 34b) sont formées entre les parties torsadées (32a, 32b) et l'extrémité de borne adjacente.

9. Connecteur électrique pour interconnecter plusieurs conducteurs (50) à un nombre identique de broches (11) situées en un réseau rapproché et fixe dans au moins une rangée, comprenant:

plusieurs bornes (12), formées chacune d'un flan de métal découpé, chaque borne comportant une partie (92) de déplacement d'isolant adjacente à une extrémité et une partie de contact à broche élastique (90) adjacente à l'extrémité opposée comprenant deux éléments de fourche torsadés; et

un boîtier isolant (40) présentant plusieurs cavités (44);

le connecteur électrique étant caractérisé en ce que le boîtier (40) comporte une extrémité de réception de broches et une extrémité de réception de conducteurs, chaque cavité (44) communiquant avec un canal ouvert (42) à l'extrémité de réception de conducteurs, chaque canal (42) étant défini par une base, deux parois latérales opposées et une face ouverte opposée à la base, la face ouverte de chaque canal (42) étant située sur un côté du boîtier (40);

les bords latéraux du flan découpé étant sensiblement linéaires et parallèles entre leurs extrémités, le flan découpé ayant une largeur qui n'est pas supérieure à l'entraxe de cavités adjacentes (44) et de canaux adjacents (42); et

la partie (20) de déplacement d'isolant de chaque borne (12) étant située dans un canal respectif (42), la partie de contact à broche élastique (90) étant positionnée à l'intérieur de la cavité correspondante (44), la partie (92) de déplacement d'isolant dans le canal (42) étant orientée de façon à recevoir un conducteur (50), inséré latéralement à l'axe de la borne (12), dans la partie (20) de déplacement d'isolant et dans le canal (42), la partie (92) de déplacement d'isolant et les éléments en fourche étant orientés par rapport à chaque canal respectif (42) et chaque cavité respective (44) de façon à exercer des contraintes résiduelles opposées entre les conducteurs adjacents (50) et des broches (11) respectivement, de manière que les bornes (12) soient préchargées dans les cavités (44) dans des canaux correspondants (42) et que plusieurs conducteurs (50) soient terminés simultanément en masse par le déplacement des fils (10) latéralement aux bornes (12) jusque dans les parties (20) de déplacement d'isolant.

10. Connecteur électrique selon la revendication 9, caractérisé en ce que les éléments de fourche comportent des parties torsadées (30a, 30b) entre leurs extrémités, les bords latéraux des bornes (12) entre la partie (92) de déplacement d'isolant et les parties torsadées (30a, 30b) portant contre des parois latérales des canaux (42) dans les cavités (44), respectivement, les parties



restantes des éléments de fourche entre les par-
es torsadées (30a, 30b) et l'autre extrémité étant
espacées des parois latérales de la cavité (44),

ladite partie restante comprenant des éléments à
ressort actif opposés.

5



10

15

20

25

30

35

40

45

50

55

60

65

11