(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 555 716 B1

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
08.05.1996 Bulletin 1996/19

(51) Int Cl.6: **H01R 13/115**, H01R 4/18

(21) Application number: **93101496.3**

(22) Date of filing: **01.02.1993**

(54) **Insulated electrical terminal and method of fabricating same**

Isolierter elektrischer Endverbinder und Herstellungsverfahren

Terminal électrique isolé et sa méthode de fabrication

(84) Designated Contracting States:
DE FR GB IT

(30) Priority: **11.02.1992 US 834019**

(43) Date of publication of application:
18.08.1993 Bulletin 1993/33

(73) Proprietor: **MOLEX INCORPORATED**
Lisle Illinois 60532 (US)

(72) Inventor: **Quinn, Robert L.**
St. Petersburg, Florida 33710 (US)

(74) Representative: **Blumbach, Kramer & Partner Patentanwälte,**
Sonnenberger Strasse 100
D-65193 Wiesbaden (DE)

(56) References cited:
EP-A- 0 006 297
EP-A- 0 090 538
FR-E- 86 790

EP 0 555 716 B1

Printed by Jouve, 75001 PARIS (FR)

Description

Field of the Invention

This invention generally relates to the art of electrical connectors and, particularly, to insulated electrical terminals of the type having a terminal for connection to the end of an insulated electrical wire and an angled insulating housing which contains the terminal and a portion of the wire.

Background of the Invention

Insulated electrical terminals of the type described generally above, and in detail herein, include a tubular end portion, commonly referred to as a ferrule, which may be placed over the stripped end of an insulated electrical wire containing a solid or stranded conductor core therein. The ferrule may be crimped mechanically and electrically to the stripped core end of the wire. The other end of the terminal typically includes a terminal tongue. The tongue may be formed as a receptacle having a generally planar portion and curled flanges extending from the edges of the planar portion. The tongue receives a flat blade-type terminal of a complementary mating connecting device. Such insulated terminals originally attained wide use in the appliance and automotive industries which often had generally standard blade or tab terminals. However, the terminals now have been used in a wide variety of other applications.

Originally, insulated terminals of the character described above were used primarily in a straight line configuration between the electrical wire and the electrical device to which it is terminated. The ferrule was at one end of an elongated member and the terminal end at the other. However, various industries have found a need to make connections to termination portions on an electrical device, with the wire being introduced at some angle to the electrical device, typically at a 90° angle. Although the electrical wire, itself, can be bent in order to make such connections, the total length consisting of the tongue configuration plus the length of the ferrule, plus the length of the bend of wire can in may applications be too long. Consequently, such insulated terminals have been designed in an angled configuration with the ferrule width, not length, being added to the tongue configuration, i.e. the exposed conductor is inserted into the ferrule at approximately a 90°, rather than a 180° offset from the mating blade-type terminal. This reduces the overall length of the connector by the bend of wire and the difference between the length and width of the crimp ferrule. Such insulated terminals commonly are called "flag" terminals.

One of the problems with such insulated terminals, particularly flag-type terminals, involves the provision of strain relief on the insulated electrical wire itself. In other words, although the conductor core of the wire is crimped to the terminal inside the insulating housing, in certain environments the conductor core may flex and possibly break if the movement is not restrained. This condition may be particularly prevalent in high vibration environments such as automotive applications. Other applications where these problems are encountered may include aircraft, railroad, appliance and environments involving electric motors.

In high vibration environments such as those described above, crimping means have been provided to crimp or clamp onto the outer insulation of the insulated electrical wire to relieve the strain on the conductor core of the electrical wire. In a right angle or "flag" terminal, heretofore it has been common to leave one side of the insulating housing open for insertion of the terminated wire after the crimping operation. However, in high vibration environments, an open side of the insulated terminal is undesireable due to the possibility of shock or shorts or other dangers caused by uninsulated terminals with an exposed voltage potential.

Another type of crimping operation involves the use of a crimped ferrule for the conductor core of the insulated wire, with the ferrule preassembled into the insulated housing before crimping. Such a flag-type electrical terminal is described in document EP-A-0006297. That terminal is pre-insulated by means of a housing which receives the ferrule. The inserted ferrule can be crimped to a wire whereby the stripped end of the wire is inserted thereinto through a wire-receiving opening. However, if strain relief on the insulated wire, itself, is desired in an electrical terminal of the type described, a second crimp ferrule for the wire insulation should be added, but without full insulation protection of the housing. The second insulation crimping ferrule also may contribute to a larger overall connector, and space often is at a premium to the user of insulated terminals of the flag configuration.

This invention is directed to solving the problems discussed above by providing a low profile angled or flag terminal which is fully insulated and which includes an insulation gripping strain relief means to prevent breakage of the conductor core of an insulated electrical wire in a high vibration environment.

Summary of the Invention

An object, therefore, of the invention is to provide a new and improved insulated terminal of the character described, particularly a flag-type terminal, and particularly including strain relief means on the insulated portion of an insulated electrical wire.

Another object of the invention is to provide a method of fabricating an insulated terminal of the character described.

The invention is disclosed in an insulated terminal for connection to the end of an insulated electrical wire having a stripped or exposed end of the conductor core projecting from the wire insulation. An angled insulating housing has a through passage with a first passage por-

tion communicating with and at an angle to a second passage portion. The first passage portion includes an open end for receiving a complementary mating terminal, and the second passage portion includes an open end for receiving the insulated electrical wire. A terminal is positioned into the first passage portion through the open end thereof. The terminal includes an outward contact section for connection to the mating blade terminal and an inward crimp section for crimping onto the conductor core of the insulated electrical wire inserted into the second passage portion. The invention contemplates a crimp ferrule positioned into the second passage portion for crimping onto the insulation of the insulated electrical wire.

In the exemplary embodiment of the invention, generally, complementary interengaging means are provided between the crimp ferrule for the wire insulation and the crimp section of the terminal for the conductor core, to fix the crimp ferrule to the crimp section and maintain them in a fixed condition in response to crimping at least one of the crimp ferrule or the crimp section. More specifically, the complementary interengaging means are provided in the form of telescoped portions of the crimp ferrule and the crimp section. The crimp ferrule and the crimp section are disclosed as being generally tubular.

Other objects, advantageous features and advantages of the invention will be apparent from the following detailed description taken in connection with the accompanying drawings, in which like reference numerals identify like elements in the figures and in which:

FIGURE 1 is a perspective view of the terminal according to the invention partly in section to show the insulation grip ferrule.
FIGURE 2 is a central sectional view through an insulated terminal embodying the concepts of the invention;
FIGURE 3 is a section through the angled insulating housing of the terminal;
FIGURE 4 is an end elevational view looking toward the front of Figure 3;
FIGURE 5 is a section through the crimp ferrule for the wire insulation of the insulated electrical wire.
FIGURE 6 is a top plan view of the terminal, itself, isolated from the insulating housing;
FIGURE 7 is an end elevational view looking toward the right-hand end of Figure 6; and
FIGURE 8 is an end elevational view looking toward the front of Figure 6.

Detailed Description of the Preferred Embodiment

Referring to the drawings in greater detail and first to Figure 1, the invention is disclosed herein as embodied in an insulated terminal generally designated 10, for connection to the end of a conventional insulated electrical wire (not shown). Suffice it to say, the insulated electrical wire has a stripped or exposed end of a conductor core projecting from the wire insulation, as is well known in the art. Generally, insulated terminal 10 includes an angled insulating housing, generally designated 12. The housing mounts therewithin, substantially surrounding and insulating, an angled terminal, generally designated 14, and a crimp ferrule, generally designated 16.

It can be seen in Figures 1 and 2 that the entire configuration of housing 12, terminal 14 and crimped ferrule 16 is a right-angled configuration to provide a "flag" terminal. In other words, a complementary mating terminal will be inserted in the direction of arrow "A", and the insulated electrical wire will be inserted in the direction of arrow "B" at approximately 90° to the insertion direction of the mating terminal.

Referring to Figures 2 and 3 in conjunction with Figure 1, angled insulating housing 12 has a right-angled through passage, with a first passage portion 18 including an open end 20 for receiving the complementary mating terminal. The first passage portion communicates with, and is at a 90° angle to, a second passage portion 22 having an open end 24 for receiving the insulated electrical wire. The second passage portion has a slight reduced-diameter neck 26, as best seen in Figure 3.

Referring to Figures 6-8 in conjunction with Figure 2, terminal 14 is positionable into first passage 18 of housing 12 through open end 20 of the passage in the direction of arrow "A". The terminal includes an outward contact section having a generally planar portion 28, and an inward crimp section 30 for crimping onto the exposed conductor core of the insulated electrical wire inserted through open end 24 of second passage portion 22. The contact section of terminal 14 is formed as a receptacle, with curled flanges 32 along opposite side edges of planar portion 28, for receiving a complementary flat mating terminal tab. Specifically, looking at Figure 7, the complementary mating terminal tab would be inserted into the contact section overlying planar portion 28 and beneath down turned edges 34 of curled flanges 32, whereby the flanges resiliently hold the terminal tab in terminating condition.

Crimp section 30 is generally tubular, as seen best in Figure 8, for receiving the stripped conductor core of the insulated electrical wire. As seen best in Figure 6, the crimp section has a reduced diameter area defining a neck 40, for purposes described hereinafter.

Referring to Figure 5 in conjunction with Figures 2 and 6, crimp ferrule 16 is generally tubular in configuration and includes an outer tubular portion 42 and an inner tubular portion 44, with a folded area defining an internal annular shoulder 46. In addition, inner tubular portion 44 is indented, annularly thereabout, as at 48.

The method of assembling insulated terminal 10 now will be described. First, terminal 14 is inserted into first passage portion 18 of insulating housing 12, in the direction of arrow "A", to the position shown in Figure 2 wherein crimp section 30 is aligned with second pas-

sage portion 22. Crimp ferrule 16 then is inserted into the second passage portion in the direction of arrow "B" such that inner tubular portion 44 of the crimp ferrule telescopes over the reduced diameter portion of crimp section 30. The crimp ferrule is inserted until the inner end thereof abuts neck 40 of crimp section 30 of the terminal, shoulder 46 abuts the end of the crimp section and outer tubular portion 42 abuts neck 26 within the second passage portion of insulating housing 12. Indented section 48 of the crimp ferrule grips the crimp section of the terminal sufficiently to hold the crimp ferrule telescoped over the crimp section until a subsequent crimping operation. It can be seen in Figure 6 that a slot or relieved area 50 is provided in terminal 14 alongside crimp section 30 to allow crimp ferrule 16 to be telescoped over the crimp section. The insulated terminal now is in its preassembled condition ready to be crimped to an insulated electrical wire.

When it is desired to use insulated terminal 10, an insulated electrical wire, having an exposed or stripped end of a conductor core projecting from the wire insulation, is inserted into open end 24 of second passage portion 22 of insulating housing 12, through crimp ferrule 16 and into crimp section 30 of terminal 14. The stripped conductor core will project substantially into crimp section 30, and a portion of the wire insulation adjacent the exposed conductor core will be located within crimp ferrule 16 outwardly of crimp section 30. In other words, the end of the wire insulation will stop short of shoulder 46 defined in the crimp ferrule. In a single crimping operation, crimp section 30 of terminal 14 and crimp ferrule 16 can be crimped onto the insulated wire whereby the crimp section clamps or crimps onto the exposed end of the conductor core of the wire, and crimp ferrule 16 clamps or crimps onto the wire insulation adjacent the exposed conductor core to provide strain relief for the termination. It can be seen that the entire terminal (14), crimp ferrule (16) and exposed end of the conductor core of the wire are completely enclosed by insulating housing 12. There are no open side walls in the terminal other than the open ends required for the insertion of the mating wire and terminal.

It will be understood that the invention may be embodied in other specific forms without departing from the scope of the appended claims.

Claims

1. In an insulated terminal (10) for connection to an end of an insulated electrical wire having an exposed conductor core projecting from the insulation, said terminal including:

   an angled insulating housing (12) having a through-passage defined by a first passage portion (18) communicating with and at an angle to a second passage portion (22), the first passage portion including a first open end (20) through which a complementary mating terminal is received and the second passage portion including a second open end (24) for receiving the insulated electrical wire;
   a terminal portion (14) positionable into the first passage portion (18) through the first open end (20), the terminal portion (14) including an outward contact section (28, 32) for direct connection to the mating terminal and an inward crimp section (30) for crimping directly onto the conductor core of the insulated electrical wire inserted into the second passage portion (22); and
   an open-ended cylindrical crimp ferrule (16) having one end adjacent the inward crimp section (30) of the terminal portion (14) and the other end adjacent said second open end (24), said crimp ferrule (16) adapted to receive the insulated electrical wire therethrough such that said exposed conductor core is positionable within said inward crimp section (30) of the terminal portion (14), an insulated portion of the wire adjacent the exposed conductor core being positionable within the crimp ferrule (16) adjacent said second open end (24),
   said housing (12) being deformable whereby the inward crimp section (30) of the terminal portion (14) is adapted to be crimped directly about said exposed conductor core and the crimp ferrule (16) is adapted to be crimped directly about said insulated portion of the wire by applying a crimping force to said housing (12);
   said insulated terminal (10) characterized in that:
   said crimp ferrule (16) is separate from said terminal portion (14) and is receivable through said second open end (24) of the second passage portion (22) of the housing an insulated portion of the wire adjacent the exposed conductor core being positionable within the crimp ferrule (16) adjacent said second open end (24), so that said crimp ferrule forms an insulation gripping strain relief means to prevent breakage of the conductor core, and
   said housing (12) encloses entirely said terminal portion (14) and said crimp ferrule (16).

2. In an insulated terminal (10) as set forth in claim 1, including complementary interengaging means (44) between the crimp ferrule (16) and the crimp section (30) of the terminal portion (14) for fixing the crimp ferrule (16) to the crimp section (30).

3. In an insulated terminal (10) as set forth in claim 2, wherein said complementary interengaging means (44) comprise telescoped portions of the crimp fer-

rule (16) and crimp section (30).

4. In an insulated terminal (10) as set forth in claim 1, wherein said first (18) and second (22) passage portions extend at a right angle with respect to each other.

5. In an insulated terminal (10) as set forth in claim 4, wherein said contact section of the terminal portion (14) is generally flat (28) with curled flanges (32) along opposite side edges thereof for receiving a generally flat mating terminal through the second open end of the second passage.

6. In an insulated terminal (10) as set forth in claim 5, wherein said crimp section (30) of the terminal is generally tubular.

7. In an insulated terminal (10) as set forth in claim 6, wherein said crimp ferrule (16) and crimp section (30) are interengaged by means of telescoped portions thereof.

8. A method of fabricating an insulated terminal (10) for connection to an end of an insulated electrical wire having an exposed conductor core projecting from the insulation, wherein the insulated terminal includes an angled insulating housing (12) having a through-passage with a first passage portion (18) communicating with, and at an angle to, a second passage portion (22), the first passage portion including a first open end (20) for receiving a complementary mating terminal and the second passage portion including a second open end (24) for receiving the insulated electrical wire, the method comprising the steps of:

   inserting a terminal member (14) into the first passage portion through the first open end, said terminal member having an inner crimp section (30) communicating with the second passage portion for crimping directly onto the exposed conductor core of the insulated electrical wire; and
   inserting an open-ended cylindrical crimp ferrule (16) into the second passage portion through the second open end into engagement with and communicating with the crimp section of the terminal member for crimping directly onto a portion of the wire insulation adjacent the exposed conductor core.

9. The method of claim 8, including the steps of:

   inserting an insulated electrical wire into said second passage portion (22) so that the exposed conductor core is located in said crimp section (30) and the portion of the wire insulation adjacent the exposed conductor core is located in the crimp ferrule (16); and
   crimping the crimp section (30) onto the exposed conductor core and crimping the crimp ferrule (16) onto the portion of the wire insulation adjacent the exposed conductor core.

10. The method of claim 9, wherein said crimping of the crimp section (30) onto the exposed conductor core of said insulated electrical wire and said crimping of the crimp ferrule (16) onto the portion of the wire insulation adjacent the exposed conductor core is performed in a single operation.

Patentansprüche

1. Isolierter Kontakt (10) zur Verbindung mit einem Ende einer isolierten elektrischen Leitung, die einen aus der Isolation vorstehenden, freigelegten Leiterkern besitzt, mit:

   einem winkligen, isolierenden Gehäuse (12) mit einem durch ein erstes Durchgangsteil (18) definierten Durchgang, der unter einem Winkel mit einem zweiten Durchgangsteil (22) in Verbindung steht, wobei der erste Durchgangsteil ein erstes offenes Ende (20) enthält,
   durch den ein komplementärer angepaßter Kontakt aufgenommen wird, und der zweite Durchgangsteil ein zweites offenes Ende (24) zur Aufnahme des isolierenden elektrischen Leiters besitzt,
   einen in den ersten Durchgangsteil (18) durch das erste offene Ende (20) einlagerbaren Kontaktteil (14), wobei der Kontaktteil (14) einen äußeren Kontaktabschnitt (28, 32) zur direkten Verbindung mit dem angepaßten Kontakt und einen äußeren Crimpabschnitt (30) zum direkten Crimpen an den Leiterkern der isolierenden elektrischen Leitung aufweist, die in den zweiten Durchgangsteil (22) eingesetzt ist, und
   eine offene zylindrische Crimphülse (16), bei der ein Ende nahe dem inneren Crimpabschnitt (30) des Kontaktabschnitts (14) und das andere Ende nahe dem zweiten offenen Ende (24) angeordnet ist, wobei die Crimphülse (16) die isolierende elektrische Leitung in sich aufnehmen kann, derart, daß der freigelegte Leiterkern in den inneren Crimpabschnitt (30) bei dem Kontaktabschnitt (14) einbringbar ist,
   wobei das Gehäuse (12) deformierbar ist, so daß der innere Crimpabschnitt (30) des Kontaktabschnitts (14) direkt auf den freigelegten Leiterkern und die Crimphülse (16) direkt auf den isolierenden Teil der Leitung durch Ausüben einer Crimpkraft auf das Gehäuse (12) aufcrimpbar sind,

dadurch gekennzeichnet, daß
die Crimphülse (16) von dem Kontaktteil (14) getrennt und über das zweite offene Ende (24) des zweiten Durchgangsteils (22) des Gehäuses aufnehmbar ist,
daß ein isolierender Teil der Leitung nahe dem freigelegten Leiterkern in die Crimphülse (16) nahe dem zweiten offenen Ende (24) einbringbar ist, so daß die Crimphülse eine isolationsergreifende Zugentlastungseinrichtung bildet, um einen Bruch des Leiterkerns zu verhindern, und
daß das Gehäuse (12) den Kontaktteil (14) und die Crimphülse (16) vollständig umschließt.

2. Isolierender Kontakt nach Anspruch 1 mit einer komplementären, verbindenden Einrichtung (44) zwischen der Crimphülse (16) und dem Crimpabschnitt (30) des Kontaktabschnitts (14) zur Festlegung der Crimphülse (16) an dem Crimpabschnitt (30).

3. Isolierender Kontakt (10) nach Anspruch 2, bei dem die komplementäre, verbindende Einrichtung (44) teleskopartig ineinandergreifende Teile der Crimphülse (16) und des Crimpabschnitts (30) umfaßt.

4. Isolierender Kontakt (10) nach Anspruch 1, bei dem der erste (18) und der zweite (22) Durchgangsteil sich rechtwinklig zueinander erstrecken.

5. Isolierender Kontakt (10) nach Anspruch 4, bei dem der Kontaktabschnitt des Kontaktteils (14) generell flach (28) mit gebogenen Flanken (32) entlang entgegengesetzten Seitenkanten des Kontaktabschnitts ausgebildet ist, um einen generell flachen, angepaßten Kontakt durch das zweite offene Ende des zweiten Durchgangs aufzunehmen.

6. Isolierender Kontakt (10) nach Anspruch 5, bei dem der Crimpabschnitt (30) des Kontakts generell rohrförmig ist.

7. Isolierender Kontakt (10) nach Anspruch 6, bei dem die Crimphülse (16) und der Crimpabschnitt (30) mit Hilfe teleskopförmiger Teile verbindbar sind.

8. Verfahren zur Herstellung eines isolierenden Kontakts (10) zur Verbindung mit einem Ende einer isolierten elektrischen Leitung, die einen aus der Isolation vorstehenden, freigelegten Leiterkern besitzt, wobei der isolierte Kontakt ein winkliges, isolierendes Gehäuse (12) einen Durchgang mit einem ersten Durchgangsteil (18) besitzt, der unter einem Winkel mit einem zweiten Durchgangsteil (22) in Verbindung steht, der erste Durchgangsteil ein erstes offenes Ende (20) zur Aufnahme eines komplementären, angepaßten Kontakts und der zweite Durchgangsteil ein zweites offenes Ende (24) zur Aufnahme der isolierten elektrischen Leitung besitzt, mit den Verfahrensschritten:

Einsetzen eines Kontaktgliedes (14) in den ersten Durchgangsteil durch das erste offene Ende, wobei das Kontaktglied einen inneren Crimpabschnitt (30) besitzt, der mit dem zweiten Durchgangsteil in Verbindung steht und direkt auf den freigelegten Leiterkern der isolierten elektrischen Leitung aufcrimpbar ist, und
Einsetzen einer offenen zylindrischen Crimphülse (16) in den zweiten Durchgangsteil durch das zweite offene Ende in Verbindung mit dem Crimpabschnitt des Kontaktgliedes zum direkten Aufcrimpen auf einen Teil der Leitungsisolation nahe dem freigelegten Leiterkern.

9. Verfahren nach Anspruch 8 mit den Schritten:

Einsetzen einer isolierten elektrischen Leitung in den zweiten Durchgangsteil (22) derart, daß der freigelegte Leiterkern sich in dem Crimpabschnitt (30) und der nahe dem freigelegten Leiterkern befindliche Teil der Leitungsisolation sich in der Crimphülse (16) befinden, und
Aufcrimpen des Crimpabschnitts (30) auf den freigelegten Leiterkern und der Crimphülse (16) auf den sich nahe dem freigelegten Leiterkern befindenden Teil der Leitungsisolation.

10. Verfahren nach Anspruch 9, bei dem das Aufcrimpen des Crimpabschnitts (30) auf den freigelegten Leiterkern der isolierten elektrischen Leitung und der Crimphülse (16) auf den sich nahe dem freigelegten Leiterkern befindenden Teil der Leitungsisolation in einem einzigen Vorgang erfolgt.

Revendications

1. Borne isolée (10) pour connexion à une extrémité d'un fil électrique isolé ayant une âme conductrice dénudée en saillie par rapport à l'isolant, ladite borne comprenant :

un boîtier isolant en angle (12) comportant un conduit traversant défini par une première partie de conduit (18) en communication avec une seconde partie de conduit (22) et formant un certain angle avec elle, la première partie de conduit possédant une première extrémité ouverte (20) par laquelle on introduit une borne d'accouplement complémentaire, et la seconde partie de conduit possédant une seconde extrémité ouverte (24) pour recevoir

le fil électrique isolé ;
une partie borne (14) pouvant être placée dans la première partie de conduit (18) par la première extrémité ouverte (20), la partie borne (14) incluant, vers l'extérieur, une section de contact (28, 32) pour connexion directe à la borne complémentaire et, vers l'intérieur, une section de sertissage (30) pour sertissage directement sur l'âme conductrice du fil électrique isolé introduit dans la seconde partie de conduit (22) ; et
une bague de sertissage cylindrique à extrémité ouverte (16) ayant une extrémité adjacente à la section de sertissage intérieure (30) de la partie borne (14) et l'autre extrémité adjacente à ladite seconde extrémité ouverte (24), ladite bague de sertissage (16) étant conçue pour y recevoir le fil électrique, de sorte que ladite âme conductrice dénudée puisse se placer dans ladite section de sertissage intérieure (30) de la partie borne (14), une partie isolée du fil, adjacente à l'âme conductrice, pouvant se placer dans la bague de sertissage (16) adjacente à la seconde extrémité ouverte (24) ; ledit boîtier (12) étant déformable, ce par quoi la section de sertissage intérieure (30) de la partie borne (14) est conçue pour se sertir directement autour de ladite âme conductrice dénudée et la bague de sertissage (16) est conçue pour se sertir directement autour de ladite partie isolée du fil, par application d'une force de sertissage audit boîtier (12);
ladite borne isolée (10) étant caractérisée :
en ce que ladite bague de sertissage (16) est distincte de ladite partie borne (14) et peut être mise en place par ladite seconde extrémité ouverte (24) de la seconde partie de conduit (22) du boîtier, de sorte que ladite bague de sertissage constitue un moyen de soulagement de traction serrant l'isolant pour prévenir la rupture de l'âme conductrice ; et
en ce que ledit boîtier (12) renferme entièrement ladite partie borne (14) et ladite bague de sertissage (16).

2. Borne isolée (10) selon la revendication 1, comprenant un moyen de blocage réciproque complémentaire (44) entre la bague de sertissage (16) et la section de sertissage (30) de la partie borne (14) pour fixer la bague de sertissage (16) à la section de sertissage (30).

3. Borne isolée (10) selon la revendication 2, dans laquelle le moyen de blocage réciproque complémentaire (44) comprend des parties télescopiques de la bague de sertissage (16) et de la section de sertissage (30).

4. Borne isolée (10) selon la revendication 1, dans laquelle lesdites première (18) et seconde (22) parties de conduit s'étendent à angle droit l'une par rapport à l'autre.

5. Borne isolée (10) selon la revendication 4, dans laquelle ladite section de contact de la partie borne (14) est globalement plate (28) avec des ailes en boucle (32) le long de ses bords latéraux opposés, pour recevoir, par la seconde extrémité ouverte du second conduit, une borne complémentaire globalement plate.

6. Borne isolée (10) selon la revendication 5, dans laquelle ladite section de sertissage (30) de la borne est globalement tubulaire.

7. Borne isolée (10) selon la revendication 6, dans laquelle ladite bague de sertissage (16) et ladite section de sertissage (30) se bloquent réciproquement au moyen de leurs parties télescopiques.

8. Procédé de fabrication d'une borne isolée (10) pour connexion à une extrémité d'un fil électrique isolé ayant une âme conductrice dénudée en saillie par rapport à l'isolant, la borne isolée comprenant un boîtier isolant en angle (12) comportant un conduit traversant avec une première partie de conduit (18) communiquant avec une seconde partie de conduit (22) et formant un certain angle avec elle, la première partie de conduit possédant une première extrémité ouverte (20), pour recevoir une borne d'accouplement complémentaire, et la seconde partie de conduit possédant une seconde extrémité ouverte (24) pour recevoir le fil électrique isolé, le procédé comprenant les étapes :

d'introduction, par la première extrémité ouverte, d'un élément borne (14) dans la première partie de conduit, ledit élément borne possédant une section de sertissage intérieure (30) communiquant avec la seconde partie de conduit pour sertissage directement sur l'âme conductrice dénudée du fil électrique isolé ; et
d'introduction, par la seconde extrémité ouverte, d'une bague de sertissage cylindrique à extrémité ouverte (16) dans la seconde partie de conduit, en contact et en communication avec la section de sertissage de l'élément borne, pour sertissage directement sur une partie de l'isolant de fil adjacente à l'âme conductrice dénudée.

9. Procédé selon la revendication 8, comprenant les étapes :

d'introduction d'un fil électrique isolé dans ladite seconde partie de conduit (22) de sorte

que l'âme conductrice dénudée soit située dans ladite section de sertissage (30), et que la partie de l'isolant de fil adjacente à l'âme conductrice dénudée soit située dans la bague de sertissage (16); et
de sertissage de la section de sertissage (30) sur l'âme conductrice dénudée, et de sertissage de la bague de sertissage (16) sur la partie de l'isolant de fil adjacente à l'âme conductrice dénudée.

10. Procédé selon la revendication 9, dans lequel ledit sertissage de la section de sertissage (30) sur l'âme conductrice dénudée dudit fil électrique isolé et ledit sertissage de la bague de sertissage (16) sur la partie de l'isolant de fil adjacente à l'âme conductrice dénudée s'effectuent en une seule opération.

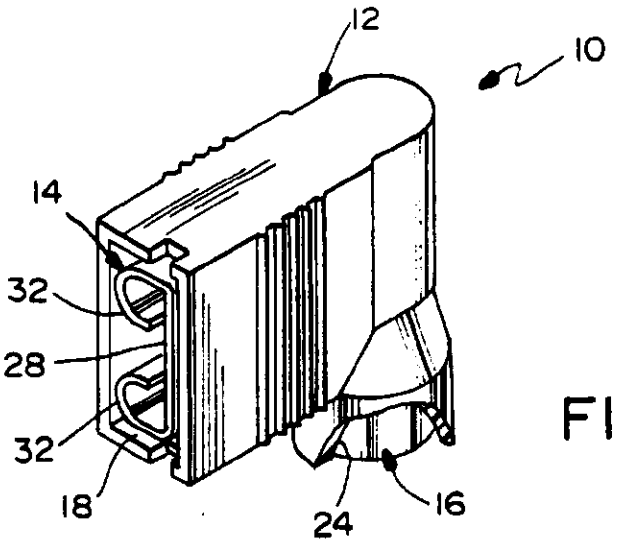

FIG.1

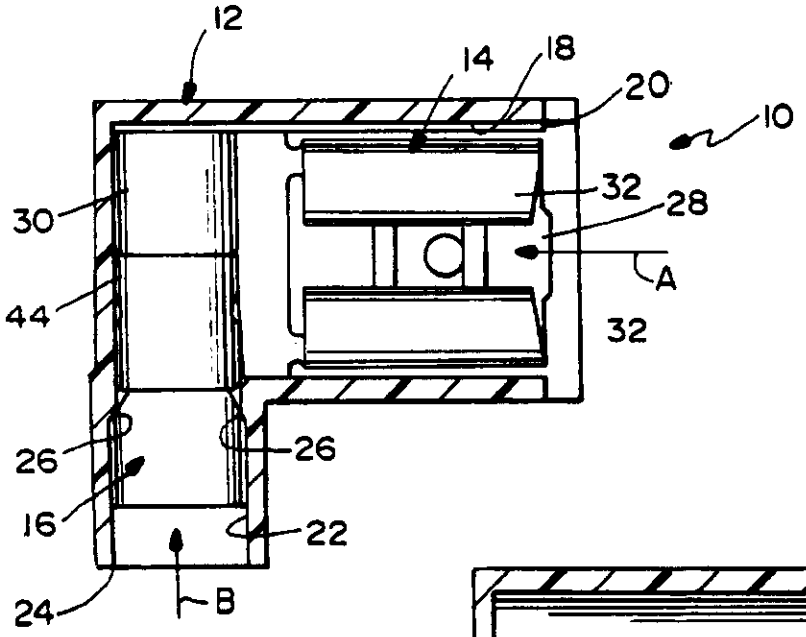

FIG.2

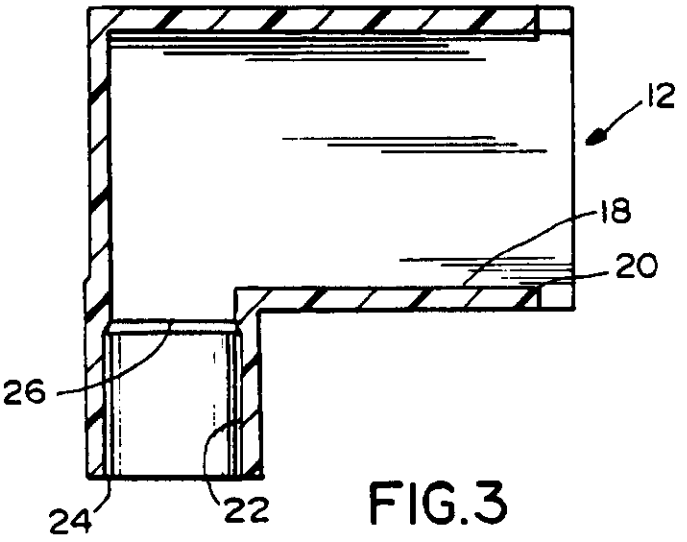

FIG.3

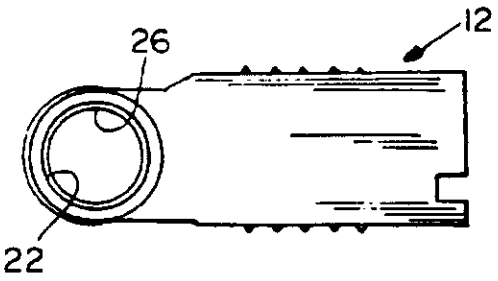

FIG.4

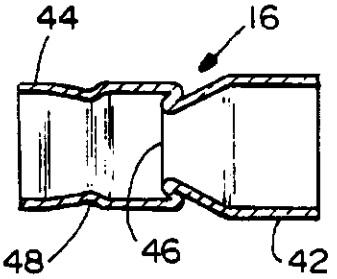

FIG.5

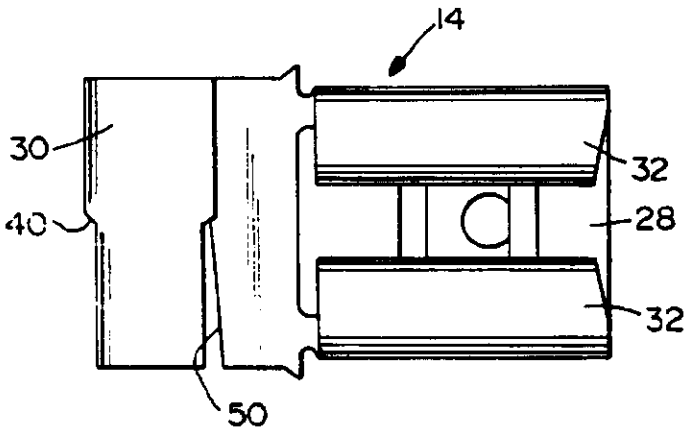

FIG.6

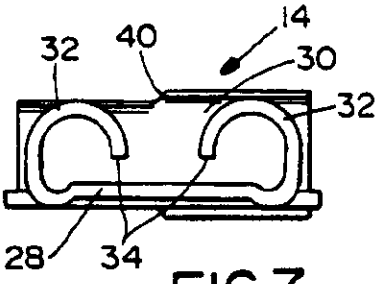

FIG.7

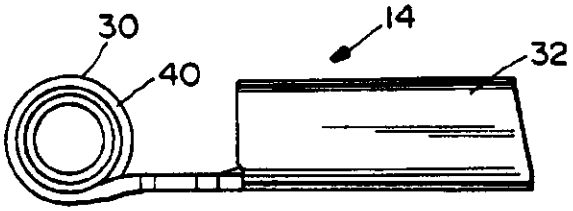

FIG.8

REGISTER ENTRY FOR EP0555716

European Application No EP93101496.3 filing date 01.02.1993

Priority claimed:
11.02.1992 in United States of America - doc: 834019

Designated States DE FR GB IT

Title INSULATED ELECTRICAL TERMINAL AND METHOD OF FABRICATING SAME.

Applicant/Proprietor
MOLEX INCORPORATED, 2222 Wellington Court, Lisle Illinois 60532, United States of America [ADP No. 50189273002]

Inventor
ROBERT L. QUINN, 3505 75th Street W., St. Petersburg, Florida 33710, United States of America [ADP No. 61138202001]

Classified to
H01R

Address for Service
F J CLEVELAND & CO, 40-43 Chancery Lane, LONDON, WC2A 1JQ, United Kingdom [ADP No. 00000141001]

EPO Representative
BLUMBACH WESER BERGEN KRAMER ZWIRNER HOFFMANN PATENTANWÄLTE, Sonnenberger Strasse 100, D-65193 Wiesbaden, Federal Republic of Germany [ADP No. 57171571001]

Publication No EP0555716 dated 18.08.1993
Publication in English

Examination requested 29.09.1993

Patent Granted with effect from 08.05.1996 (Section 25(1)) with title
INSULATED ELECTRICAL TERMINAL AND METHOD OF FABRICATING SAME

29.07.1994 Notification from EPO of change of EPO Representative details from
BLUMBACH WESER BERGEN KRAMER ZWIRNER HOFFMANN PATENTANWÄLTE, Sonnenberger Strasse 100, D-65193 Wiesbaden, Federal Republic of Germany [ADP No. 57171571001]
to
BLUMBACH WESER BERGEN KRAMER ZWIRNER HOFFMANN PATENTANWÄLTE, Sonnenberger Strasse 100, D-65193 Wiesbaden, Federal Republic of Germany [ADP No. 50114305002]
Entry Type 25.14 Staff ID. RD06 Auth ID. EPT

24.03.1995 Notification from EPO of change of EPO Representative details from
BLUMBACH WESER BERGEN KRAMER ZWIRNER HOFFMANN PATENTANWÄLTE, Sonnenberger Strasse 100, D-65193 Wiesbaden, Federal Republic of Germany [ADP No. 50114305002]
to
BLUMBACH, KRAMER & PARTNER, Patentanwälte Sonnenberger Strasse 100, D-65193 Wiesbaden, Federal Republic of Germany [ADP No. 62903091001]
Entry Type 25.14 Staff ID. RD06 Auth ID. EPT

08.02.1996 F J CLEVELAND & CO, 40-43 Chancery Lane, LONDON, WC2A 1JQ, United Kingdom [ADP No. 00000141001]
registered as address for service
Entry Type 8.11 Staff ID. LW1 Auth ID. AA

**** END OF REGISTER ENTRY ****

RENEWAL DETAILS

PUBLICATION NUMBER EP0555716

PROPRIETOR(S)

MOLEX INCORPORATED, 2222 Wellington Court, Lisle Illinois 60532, United States of America

DATE FILED 01.02.1993

DATE GRANTED 08.05.1996

DATE NEXT RENEWAL DUE 01.02.1997

DATE NOT IN FORCE

DATE OF LAST RENEWAL

YEAR OF LAST RENEWAL 00

STATUS PATENT IN FORCE

**** END OF REPORT ****