PATENTS EXAMINATION BOARD

PRACTICAL LEGAL PROBLEMS

Paper 1

EXAMINATION: JULY 2019

EXAMINERS: D DOHMEN

J WHITTAKER

MODERATOR: H MOUBRAY

DURATION: READING TIME: 1 HOUR

EXAMINATION TIME: 4 HOURS

TOTAL: 5 HOURS

NOTES TO CANDIDATES:

1. Attached to the paper are copies of the following documents:

   (i) A copy of the Patents Act No. 57 of 1978;

   (ii) A copy of the Patent Regulations 1978; and

   (iii) A copy of the Uniform Rules of the High Court under the Superior Courts Act 10 of 2013 (Rules 6, 14, 17, 18, 19, 21, 22, 23, 24, 25, 30, 35, 36 and 37).

2. Each candidate is also allowed access to (1) one dictionary during the Exam.

3. This paper consists of 20 pages in total and includes the following documents:

   (i) Questions 1 to 3 (100 marks) (pages 3 and 4);

   (ii) Document A (pages 5 to 10);

   (iii) Document B (pages 11 to 16); and

   (iv) Document C (pages 17 to 20).

4. Prior to the hand out of the answer papers, candidates will have the opportunity to read the above documents and make notes for 60 minutes.

5. Where appropriate reference should be made to case law.

6. Please note that in the marking of answers:

   (a) 30% of the marks will be allocated for advice on legal aspects;

   (b) 60% for technical/practical advice; and

   (c) 10% for the form of the advice.

A new client writes to you as follows:

"*Dear Sirs,*

My company makes electrical terminals and connectors for use in electronic equipment, as well as in products such as motor vehicles and domestic appliances. We own South African patent 2002/03914 [Document A], which relates to one of our best-selling connector designs.

We have recently received a letter from a US competitor, Black Hat Electronics, Inc. ("Black Hat"), in which they state that they intend selling in South Africa contacts for electric connectors exactly as disclosed in their US patent 7,593,000 [Document B]. They state that their contacts are structurally different to the terminals shown in our South African patent, and consequently that their contacts do not infringe our patent.

In addition, they have sent us a copy of one of their earlier US patents, i.e. US 4,500,000 [Document C], and they state in their letter that our South African patent is invalid in light of US 4,500,000.

Black Hat further states that, 'for commercial certainty', they want us to provide them with a written acknowledgement that the importation into South Africa, and the sale in South Africa, of contacts for electric connectors as disclosed in US 7,593,000 would not constitute an infringement of South African patent 2002/03914.

We are concerned about potential lost profits if Black Hat is to sell their contact in South Africa because it certainly will compete with similar products we sell in this country. Through economies of scale they could probably offer their contact at a much lower price than ours.

Please advise us as to our position and how we should respond to Black Hat.

Yours faithfully,
A. Sparks

Managing Director
Sparks Electrical (Pty) Ltd"

Your background checks establish that:

(a) ZA 2002/03914 [Document A] was filed on 26 March 2002 without a claim to priority, all formalities were correctly complied with, and ZA 2002/03914 is currently inforce;

(b) Your client has no other relevant patents; and

(c) Black Hat does not have any South African patents.

QUESTION 1 **(40 marks)**

Please provide your client with detailed advice on whether or not Black Hat's proposed importation and sale in South Africa of contacts for electric connectors as disclosed in US 7,593,000 infringes the claims of ZA 2002/03914.

QUESTION 2 **(40 marks)**

Please provide your client with detailed advice on the validity of ZA 2002/03914.

QUESTION 3 **(20 marks)**

Please provide your client with strategic advice on how to respond to the letter from Black Hat, including advice on the options available to your client.

INSULATION PIERCING TERMINAL

BACKGROUND OF THE INVENTION

There is a need for an inexpensively produced insulation piercing terminal for fitment to insulated conductors.

Insulation piercing terminals include a slot which receives the conductor. The terminal must be sufficiently rigid to enable effective piercing through the insulation of an insulated conductor. After the insulation has been pierced, the contact between the terminal and the conductor is optimally of a resilient nature in order to preserve the electrical and mechanical integrity of the connection. The terminal must be easily produced for economic reasons, and must require a minimal amount of insertion force to facilitate the connection to a conductor.

SUMMARY OF THE INVENTION

The subject electrical terminal is as defined in the claims. A preferred embodiment of the invention is described in detail below and illustrated in the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a preferred embodiment of the subject terminal;

FIG. 2 is a cross-sectional view of the terminal taken along line 2-2 of FIG. 1;

FIG. 2A is a cross-sectional view taken along line 2A-2A of FIG. 1, showing a connected wire in the terminal;

FIG. 2B is a cross-section of a portion of the terminal, taken adjacent to one pair of insulation piercing edges showing their contact with the connected wire; and

FIG. 3 is a perspective view of the terminal and the connected wire.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

Referring first to FIG. 1, the terminal 10 comprises a rearward insulation gripping portion 12, an intermediate conductor engaging portion 14, and a forward portion 16 in the form of a pin 54 which may be inserted into a socket (not shown) of a complementary part to form a two-part electrical coupling. The insulation gripping portion 12 includes a pair of arms 18 and 20 which extend from a base 22, and which are opposite to and offset relative to one another. The arms 18 and 20 may be bent to grip the insulation of an electrical wire 66 (as shown in FIG. 3) using a suitable tool. This serves to secure the electrical wire 66 to the terminal 10 adjacent the intermediate conductor engaging portion 14 so as to avoid damage to the electrical and mechanical integrity of the connection.

With reference also to FIGS. 2 and 2A, the intermediate conductor engaging portion 14 comprises a first side member 24 and a second side member 26 which are spaced apart by a spacer member in the form of a terminal floor 28. As can be seen, the side members 24 and 26 extend upwardly from the spacer member 28 to define a wire receiving channel 30. The first side member 24 has a front end portion 32 and a rear end portion 36 which extend orthogonally relative to the remaining portion of the first side member. Similarly, the second side member 26 has a front end portion 34 and a rear end portion 38 which extend orthogonally relative to the remaining portion of the second side member. The front end portions 32 and 34 extend towards one another over the spacer member 28 to form a forward pair of jaws, and the rear end portions 36 and 38 extend towards one another over the spacer member 28 to form a rearward pair of jaws.

As shown in FIGS. 1 and 2, each pair of jaws presents two cutting edges 40 which define a wire receiving slot extending from an open end into which an electrical wire may be inserted to the spacer member 28. Upper portions of the cutting edges 40 converge towards one another to define a substantially V-shaped upper entry portion 42 which facilitates entry of an electrical wire into the slot. Below the entry portion 42, the cutting edges of each pair of jaws define a lower insulation piercing slot 44

which has a generally rectangular shape. The slot 44 has a length which extends towards the spacer member 28, and a width which is constant along the length of the slot.

The intermediate conductor engaging portion 14 is further provided with indents 46 and 48 formed in respective side members 24 and 26 along lower longitudinal bends 50 and 52 respectively. The indents 46 and 48 extend into the wire receiving channel 30 and serve to increase the rigidity of the side members.

Referring now to FIGS. 2, 2A and 2B, the conductor engaging portion 14 is intended for connection to the electrical wire 66 which has a conductor 70 and outer insulation 68. The conductor 70 is representatively shown to be a plurality of discrete strands, but may alternatively be a solid core. Comparing FIGS. 2 and 2A, the width of the wire receiving channel 30 is slightly greater than the outer diameter of the wire insulation 68, and the width of the insulation piercing slot 44 is slightly less than the diameter of the conductor 70.

As specifically shown in FIGS. 2A, 2B and 3, the insertion of the electrical wire 66 into the wire receiving channel 30 using a suitable pressing tool (not shown) causes the wire to be guided through the entry portions 42 and into the lower piercing slots 44 (only one of which is shown in FIGS. 2A and 2B). As the electrical wire 66 is forced into the piercing slots 44, the cutting edges 40 of the jaws pierce the insulation 68 to electrically and mechanically engage the inner conductor 70.

It should be noted that the forced entry of the electrical wire 66 into the slots 44 causes a force to be distributed outwardly along the front jaws 32 and 34 and along the rear jaws 36 and 38, and these outward forces tend to deflect the side members 24 and 26 outwardly. The rigidity of the side members 24 and 26, enhanced by the indents 46 and 48, exerts a counter force upon the electrical wire 66 via the front and rear jaws. The counter force, which is spring-like, results in a resilient pinching of the inner conductor 70 between the front jaws and the rear jaws, and ensures that the integrity of the connection is maintained even with temperature variations which tend to impact such connections. In addition, the spring-like counter force allows the terminal 10 to accommodate conductors with slightly different diameters.

Claims:

1. An electrical terminal for insulation piercing connection of an electrical wire formed by a conductor covered with insulation, the terminal including:

   a conductor engaging portion having a first side member and a second side member which are connected to a spacer member by respective bends;

   the first side member defining a first cutting edge, and the second side member defining a second cutting edge which is directed towards but spaced from the first cutting edge to form a wire receiving slot;

   the wire receiving slot extending from an open end into which an electrical wire may be inserted to the spacer member, wherein at least a portion of the wire receiving slot has a generally rectangular shape, the width of which is slightly less than the diameter of the conductor, and the length of which extends towards the spacer member; and

   the first and second cutting edges piercing through the insulation of the electrical wire to establish electrical and mechanical engagement therewith when a portion of the electrical wire is inserted into the wire receiving slot.

2. An electrical terminal as claimed in claim 1, wherein the wire receiving slot includes a substantially V-shaped portion adjacent the generally rectangular portion for facilitating insertion of an electrical wire into the wire receiving slot.

3. An electrical terminal as claimed in claim 2, wherein the substantially V-shaped portion of the wire receiving slot is defined by sections of the first and second cutting edges which converge towards the generally rectangular portion of the slot.

4. An electrical terminal as claimed in any one of the preceding claims, wherein each of the first and second side members includes an end portion which extends

orthogonally relative to the remaining portion of the respective side member, and wherein each end portion carries one of the cutting edges.

5. An electrical terminal as claimed in any one of the preceding claims, wherein each of the first and second side members includes two cutting edges, and wherein the cutting edges are configured to form two wire receiving slots.

1/1

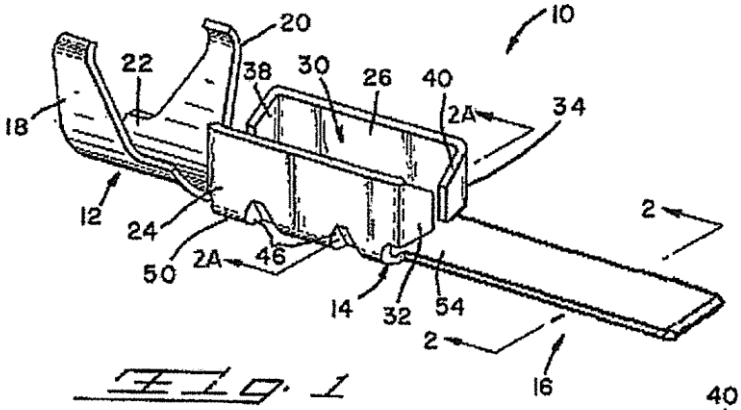

Fig. 1

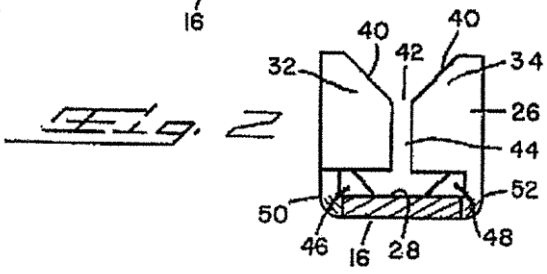

Fig. 2

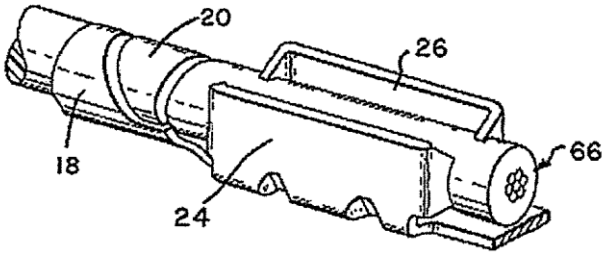

Fig. 3

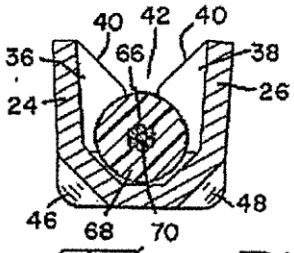

Fig. 2A

Fig. 2B

United States Patent [19]

Frazer

[11] 7,593,000

[45] Sep. 22, 2009

[54] CONTACT FOR ELECTRIC CONNECTOR

[75] Inventor: Fred Q. Frazer, Bristolville, Ohio

[73] Assignee: Black Hat Electronics, Inc., Watertown, Mass.

[21] Appl. No. 12/343516

[22] Filed: Dec. 24, 2006

[51] Int. Cl.[1] H01R 11/20; H01R 43/00

[52] U.S. Cl. ..... 339/97 R; 29/882

[58] Field of Search ..... 339/97 R, 258 R, 258 P, 339/95, 96, 97 P, 98, 99, 17 LC, 17 LM, 17 M, 17 L; 29/874, 882, 881

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Primary Examiner—John McQuade

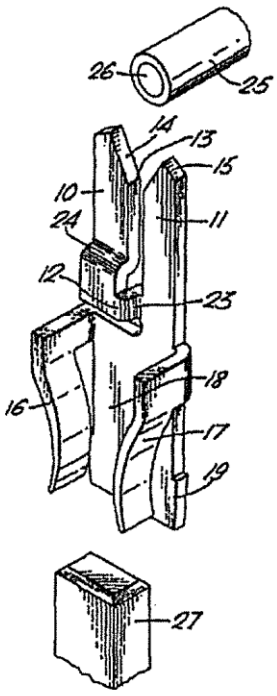
Assistant Examiner—John S. Brown

Attorney, Agent, or Firm—Kerkam, Stowell, Kondracki & Clarke

[57] ABSTRACT

A contact for an electric connector comprises a terminal element for connection to an electric conductor and a contact-making portion for connection to an electric circuit.

16 Claims, 3 Drawing Figures



CONTACT FOR ELECTRIC CONNECTOR

This invention relates to an insulation-displacement contact for an electric connector, and to a connector including such contacts.

Wires for electrical connections are usually covered with an insulating material which must be removed before a satisfactory connection can be made.

A number of connection systems have been developed using what are referred to as "insulation-displacement contacts". The most common method is to force an insulated wire into a metallic contact member having a slot the width of which is slightly less than that of the metallic wire core. The insulation is displaced either by a shearing (slicing or piercing) action or by a crushing action, or by a combination of the two. The displaced insulation is compressed by the contact member to a degree which ensures a gas-tight joint which is essential for a good long-lasting connection between corrosion-prone metal connecting parts. However, the compression of the core must not be excessive, otherwise the wire will be weakened to such an extent that it will be mechanically unacceptable.

This type of contact is often referred to as a "notch" contact, and may be of very simple form. The notch is necessarily narrow to suit the diameter of the conductor, and its width must be held to close tolerances. This may cause manufacturing problems, particularly in cases where the metal thickness is greater than the width of the notch since this may damage, or shorten the life of, the tool used to form the notch. In addition, the clamping force developed by the contact must not fall to an unacceptable level during the life of the contact.

It is an object of the invention to provide an insulation displacement contact for an electric connector which does not suffer from the above-mentioned disadvantages.

The invention will now be described with reference to the accompanying drawings, in which:

FIG. 1 is a perspective view of a stamped blank from which a contact is formed;
FIG. 2 is a similar view of a contact formed from the blank of FIG. 1, and
FIG. 3 is a front view of part of the contact of FIG. 2.

Referring now to FIG. 1, this shows a single blank or precursor, formed by stamping, from which a contact will be formed. The blank has two arms 10 and 11 joined at one base end by a link portion 12 and spaced apart to define a relatively wide notch 13. Arm 10 is slightly longer than arm 11. The free ends of arms 10 and 11 have steep slopes 14 on one side and shallower slopes 15 on the other side.

Below the base link portion 12 the blank branches out into three parallel portions. The outer two limbs 16 and 17 are located on either side of a central locating limb 18 which has an enlarged portion 19 formed on it. The entire blank may be carried on a conventional bandolier (carrier strip) 20 with pilot holes 21, and a weakened groove 22 eases detachment of the blank from the bandolier.

FIG. 2 shows a completed contact, detached from the bandolier and after a number of bending and other operations have been performed. The base link portion 12 has a double bend 23 formed in it so that the longer arm 10 is displaced out of the plane of the arm 11. A second double bend 24, formed at the lower end of arm 10, restores the upper end of this arm to the plane of arm 11. The two double bends reduce the width of the notch 13 to the value necessary to form the terminal element of the contact. This value is determined by the extent of the bends 23 and 24 and is therefore variable in manufacture. Both arms are now effectively of the same length. The steeper slopes 14 serve to guide a conductor with insulation 25, having a core 26, between the arms and into the notch 13, whilst the shallower slopes 15 serve to position an insulating cover in a complete connector.

The two lower limbs 16 and 17 are subjected to bending and forming operations which result in the formation of a leaf contact with which, for example, a pin 27 may engage. The central locating limb 18 and its enlarged portion 19 serve to position and retain the contact in an insulating cover (not shown).

FIG. 3 shows part of the contact of FIG. 2 with a conductor in position in the notch 13. As will be seen from FIG. 3 the act of pressing the conductor into the notch 13 cuts through the insulation 25 of the conductor, whilst the edges of the notch compress the core 26 to form a satisfactory electrical connection. The increased length of arm 10 relative to arm 11 results in the arm 10 having a lower stiffness, and hence this reduces the likelihood of failure of the connection.

[Claims omitted]

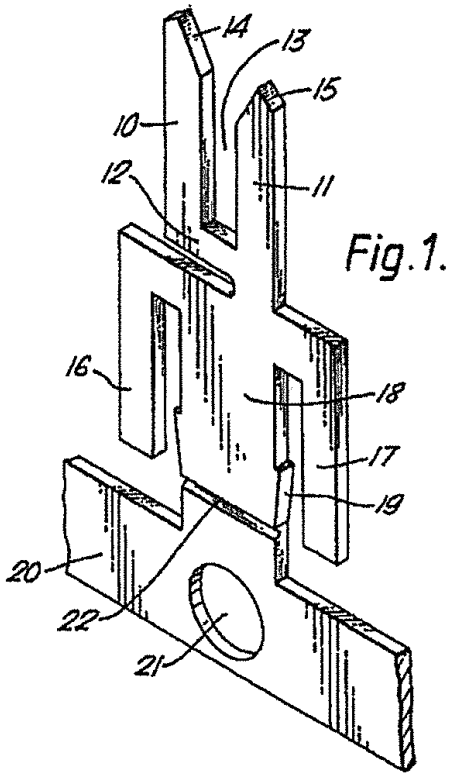


Fig. 1.

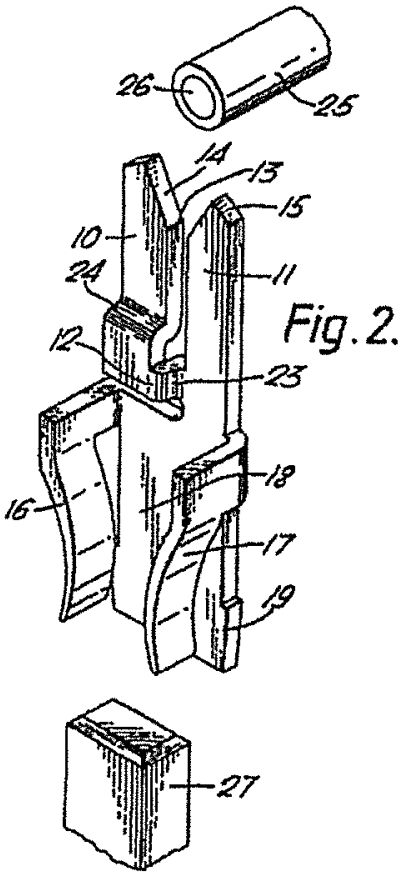

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Fig. 2.

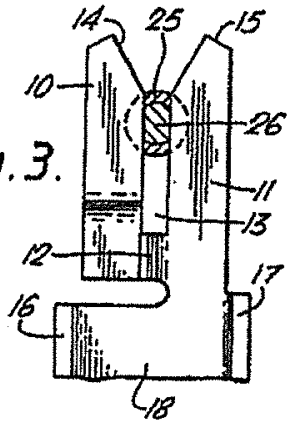
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Fig. 3.

United States Patent [19]

Frazer

[11] 4,500,000

[45] Jun. 27, 1978

[54] ELECTRICAL TERMINAL

[75] Inventor: Frederick Q. Frazer, Bristolville, Ohio

[73] Assignee: Black Hat Electronics, Inc., Watertown, Mass.

[21] Appl. No.: 748,486

[22] Filed: Dec. 8, 1976

[51] Int. Cl.² H01R 11/20

[52] U.S. Cl. ..... 339/97 R

[58] Field of Search 339/97-99

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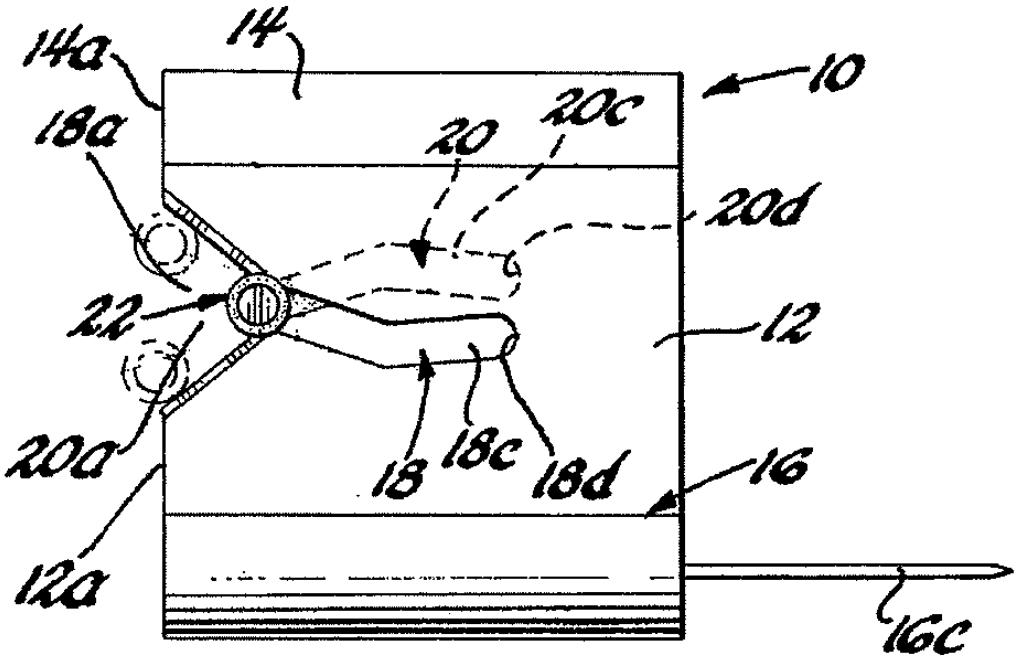
Primary Examiner—Joseph H. McGlynn

Attorney, Agent, or Firm—F. J. Fodale

[57] ABSTRACT

An electrical terminal has parallel front and back end plate portions containing respective V-shaped and inverted V-shaped slots. The end plate portions are relatively movable transversely of the slots to admit, make electrical contact with and retain an insulation covered wire.

10 Claims, 5 Drawing Figures



ELECTRICAL TERMINAL

This invention relates to electrical terminals which make electrical contact with an insulated electrical wire by displacing portions of the insulation for engaging the conductor core of the wire.

One such terminal uses a plate portion having a narrow slot into which an insulated electrical wire is pushed down such that the insulation is displaced and the conductor core is engaged by the terminal. A drawback of such a "fixed slot" terminal is that the slot is generally sized to accept a specific diameter conductor core thus requiring a different terminal for each size of insulated electrical wire. Another disadvantage is that these terminals disrupt the shape of wire cores containing multiple strands and therefore do not maintain firm electrical and mechanical contact with these multi-stranded cores.

The following is a detailed description of a preferred embodiment of the invention as illustrated in the accompanying sheet of drawings in which:

FIG. 1 is a side view of an insulation displacement terminal in accordance with this invention,

FIG. 2 is a front view of the terminal shown in FIG. 1 taken substantially along the line 2--2 of FIG. 1 and looking in the direction of the arrows,

FIG. 3 is a front view of the terminal similar to FIG. 2 showing the terminal operatively engaging an insulated electrical wire,

FIG. 4 is a section taken substantially along the line 4--4 of FIG. 3 and looking in the direction of the arrows,

FIG. 5 is a perspective view of the terminal shown in FIGS. 1 and 2 with a portion broken away to illustrate otherwise hidden detail.

Referring now to FIG. 5, the terminal 10 comprises a unitary sheet metal body formed from a strip shape which is bent into a double layered L-shaped body. More specifically the terminal 10 comprises a pair of end plates 12 and 14 positioned side-by-side in a closely spaced parallel relationship. Bottom edges of the end plates 12 and 14 are interconnected by a spring portion 16 which is of hairpin shaped section and disposed generally perpendicular and to one side of the end plates 12 and 14. The bottom leg 16a of the spring portion 16 is connected to the back end plate 14 and the top leg 16b is connected to the front end plate 12. The spring portion 16 is shown in its free unstressed state in FIGS. 1 and 2. This arrangement of the spring portion 16 permits but resists upward vertical movement of the front end plate 12 with respect to the back end plate 14 from the position shown in FIGS. 1 and 2. The front end plate 12 moves generally parallel to the back end plate 14 over the range of movement of interest, because of the length and orientation of the spring portion 16. From the bottom leg 16a an electrical contact 16c is provided as a coplanar extension, which serves as a connection to a complementary electrical connector (not shown). A central portion of leg 16a is cut out and bent downwardly at an angle to serve as a lock tab 16d for locking the terminal 10 in a connector body cavity (also not shown).

Initially, the insulated electrical wire 22 is placed in aligned V-shaped mouths 18a and 20a of slots 18 and 20, provided respectively in the front and back end plates 12 and 14. The edges defining the mouths 18a, 20a are preferably thinned and sharpened, so that they can pierce the insulation as the wire is pressed further into the slots 18, 20.

The slots 18 and 20 from the mouths 18a, 20a are of shallow V- and inverted V-shape respectively. As the wire is pushed into these it contacts the top edge of slot 18 and the bottom edge of slot 20 and urges the legs 16a, 16b apart. Then as the wire passes the apex of the V's, the springiness serves to move the legs 16a, 16b back towards each other and urge the wire towards the closed ends 18d, 20d of the slots. In this way the wire is retained in position and in firm electrical contact with the terminal.

[Claims omitted]

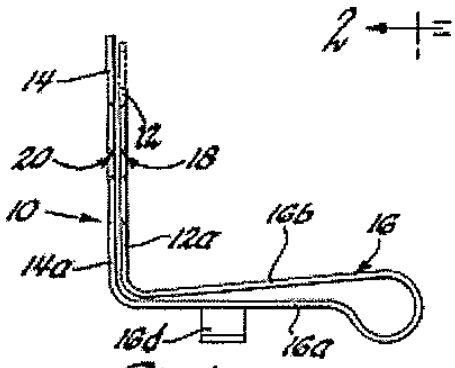


Fig. 1

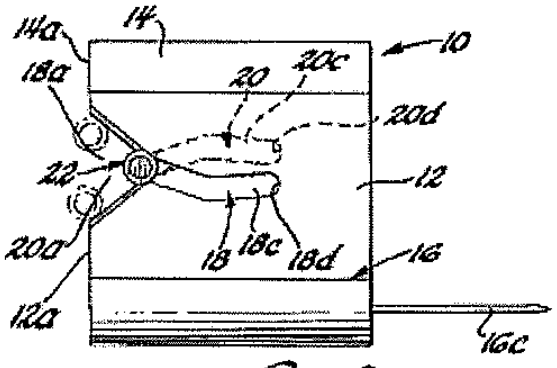


Fig. 2

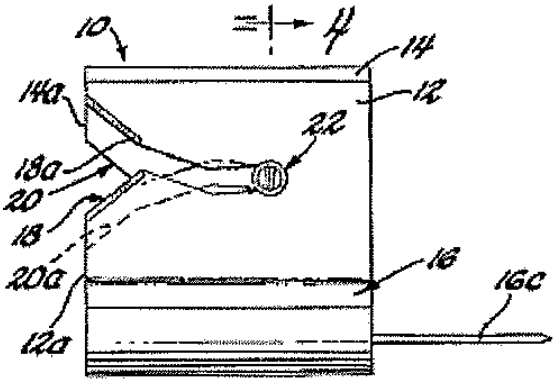


Fig. 3

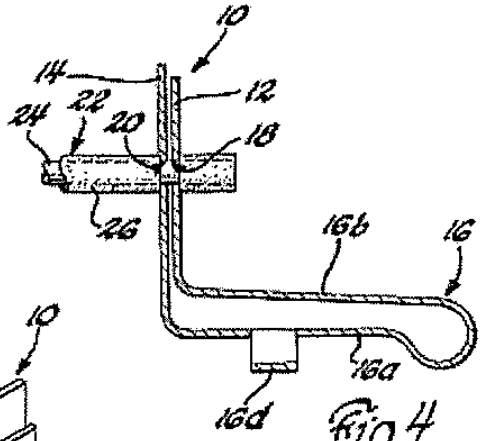


Fig. 4

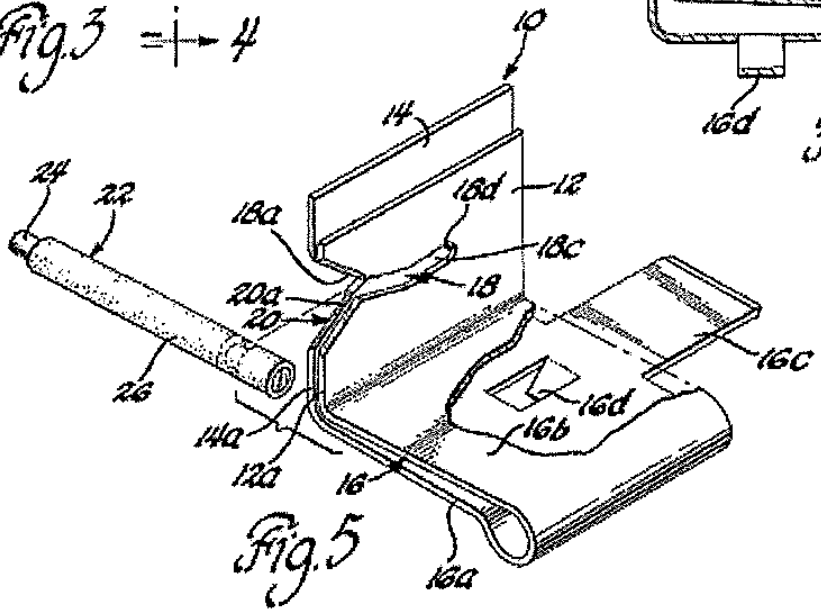


Fig. 5