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⑤④ **Shielded cable board-in connector.**

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⑦③ Proprietor : **HIROSE ELECTRIC CO., LTD.**
5-23 Oosaki 5-chome
Shinagawa-ku Tokyo (JP)

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⑦② Inventor : **Sato, Kensaku, c/o Hirose Electric**
Co., Ltd.
5-23, Oosaki 5-chome
Shinagawa-ku, Tokyo (JP)

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⑦④ Representative : **Pätzold, Herbert, Dr.-Ing.**
Steubstrasse 10
D-82166 Gräfelfing (DE)

⑤⑥ References cited :
EP-A- 0 000 996
DE-A- 2 510 299
GB-A- 2 020 919

EP 0 446 488 B1

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Description

Background of the Invention

Field of the Invention

The present invention relates to an electrical connector according to the introductory part of claim 1. Such an electrical connector is known by the GB-A-2 020 919.

Description of the Prior Art

Fig. 15 shows a conventional connector of this type, which is made by stripping a length of outer sheath of a shielded cable **a** and separating the shield wires **b** from the signal line **c**, bundling and connecting the shield wires **b** to the connection terminal **d** of a connector body **d** while connecting the signal line **c** to the connection terminal **f** by insulation displacement, for example, inserting the connection terminals **e** and **f** into the through holes of a printed circuit board **g**, and soldering them for mounting the connector.

Fig. 16 shows another conventional connection method which includes stripping a length of outer sheath of a shielded cable **a**, separating the shield wires **b** from the signal line **c**, bundling and connecting the shield wires **b** directly to the connection terminal **e** while connecting the signal line **c** directly to the connection terminal **f** by crimping, inserting the connection terminals **e** and **f** into the through holes of a printed circuit board **g**, and soldering them for mounting the terminals.

However, in the above conventional methods, it has been necessary to separately connect the shield wires **b** and the signal line **c** to the connection terminals **e** and **f**, respectively, making continuous and automatic connection difficult. The signal line **c** has been stripped of the shield wires adjacent the terminal and has had little or no shielding protection in this area.

Summary of the Invention

Accordingly, it is an object of the invention to provide an Electrical connector of the above mentioned kind which permits simultaneous connection of the signal line, shield wires, and outer sheath of a shielded cable, making possible continuous and automatic connection of a great number of signal lines and has an excellent shielding effect.

According to the invention the object is solved by the characterizing part of claim 1. Advantageous features of embodiments according to the invention are enclosed in the subclaims.

It is advantageous that the stripped front portion of a shielded cable is placeable on the board-in connector so that the signal line, the shield wires, and the

outer sheath are placed on the signal line connection portion, the shield wires crimping portion, and the outer sheath crimping portion. Then, a connection jig is inserted into the jig inlet to press the signal line and crimping tabs to the signal line connection portion and the shield wires and the outer sheath for effecting simultaneous connection of the shielded cable to the board-in connector.

Other advantages of the invention will be more apparent from the following description when taken in conjunction with the accompanying drawings.

Brief Description of the Drawings

Fig. 1 is a perspective view of a shielded cable board-in connector according to an embodiment of the invention;

Fig. 2 is a perspective view of a signal line barrel of Fig. 1;

Fig. 3 is a top plan view of the board-in connector;

Fig. 4 is a side elevation thereof;

Fig. 5 is a bottom plan view thereof;

Fig. 6 is a front elevation thereof viewed from the arrow A of Fig. 4;

Fig. 7 is a cross section taken along the line B-B of Fig. 3;

Fig. 8 illustrates how to connect a shielded cable to the board-in connector of Fig. 1;

Fig. 9 illustrates how to use the board-in connector;

Fig. 10 is a top plan view of a shielded cable board-in connector according to another embodiment of the invention;

Fig. 11 is a side elevation thereof;

Fig. 12 is a bottom plan view thereof;

Fig. 13 is a front elevation viewed from the arrow C of Fig. 11;

Fig. 14 is a cross section taken along the line D-D of Fig. 10; and

Figs. 15 and 16 show conventional board-in connectors.

Description of the Preferred Embodiment

Figs. 1-7 show a shielded cable board-in connector according to an embodiment of the invention. The connector 1 includes a shielding case 3; an insulation body 4; and a signal barrel 5. The shielding case 3 is divided into three portions; a tubular barrel retention portion 6, a shield wires (outer conductor) crimping portion 7, and an outer sheath crimping portion 8. A pair of jig inlets 10a and 10b are formed behind the barrel retention portion 6, with the jig inlet 10a extending rearwardly from the rear edge of a top face of the barrel retention portion 6. The shield wire crimping portion 7 has a pair of U-shaped crimping tabs 12 while the outer sheath crimping portion 8 has a pair of U-shaped crimping tabs 13 which are larger than

the crimping tabs 12. A shield terminal 19 extends forwardly from the front end of the shielding case 3.

As best shown in Fig. 2, the signal line barrel 5 has a signal terminal 14, a signal line crimping portion 15, and an insulator crimping portion 16. The signal terminal 14 is shaped in the form of a pin and extends forwardly from the front end of the shielding case 3 in parallel with the shield terminal 19. The signal line crimping portion 15 has a pair of U-shaped tabs 17 while the insulator crimping portion 16 has a pair of U-shaped tabs 18. The signal line barrel 5 is supported by the insulation body 4 within the barrel retention portion 6 such that the signal line crimping portion 15 and the insulator crimping portion 16 are positioned in the jig inlets 10a and 10b.

In order to connect a shielded cable 2 to the connector 1, first of all, a length of outer sheath 23 is removed from the shielded cable 2 to expose the signal line (central conductor) 20, the intermediate insulator 21, the shield wires (outer conductor) 22 as shown in Fig. 1. The shielded cable 2 is placed on the connector 1 such that the signal line 20, the intermediate insulator 21, the shield wires 22, and the outer sheath 23 are placed on the signal line crimping portion 15, the insulator crimping tabs 18, the shield wires crimping tabs 12, and the outer sheath crimping tabs 13, respectively.

As Fig. 8 shows, barrel crimping anvils 24a and 24b and clasper 25a and 25b, and shielding case crimping anvils 26a and 26b and claspers 27a and 27b are operated to simultaneously press the signal line crimping tabs 17 and the other crimping tabs 18, 12, and 13 onto the signal line 20, the intermediate insulator 21, the shield wires 22, and the outer sheath 23, respectively. More specifically, the barrel anvil 24a is inserted into the jig inlet 10a while the clasper 25a is inserted into the jig inlet 10b to press the crimping portion 15 onto the signal line 20. At the same time, the crimping anvil 24b is inserted into the jig inlet 10a while the clasper 25b is inserted into the jig inlet 10b to press the crimping tabs 18 onto the intermediate insulator 21. In addition, the shielding case anvils 26a and 26b and claspers 27a and 27b are operated to press the crimping tabs 12 and 13 onto the shield wires 22 and the outer sheath 23, respectively, to connect the shielded cable 2 to the connector 1.

As Fig. 9 shows, the shield terminal 19 and the signal terminal 14 are inserted into the through holes of a printed circuit board 28 and soldered at 31 for mounting them on the printed circuit board 28. A great number of shielded cables 2 are connected to connectors 1 as follows: A great number of shielding cases 3 are stamped from a metal sheet, with a strip 30 of the metal sheet left so that the connectors 1 are wound around a reel (not shown). When used, the connector strip 30 is unwound to effect connection of shielded cables 2 to the connectors 1 as described above.

Figs 10-14 show a board-in connector according

to another embodiment of the invention. In this embodiment, the signal line crimping portion 15 is replaced by a signal line insulation displacing portion 33 with a slit 34 extending downwardly from the top edge thereof. In addition, the insulation body 4 extends rearwardly up to the end of the signal barrel 5, while the shielding case 3 has only one jig inlet 10a on the top face thereof.

In order to connect a shielded cable 2 to the board-in connector 1, the barrel anvil 24a is inserted into the jig inlet 10a to press the signal line 20 covered with the intermediate insulator 21 (or insulated conductor 20) onto the insulation displacing portion 33 for effecting connection by insulation displacement. The other features are the same as those of the above embodiment.

As has been described above, with the connector according to the invention, it is possible to simultaneously connect a shielded cable to the connector by placing the stripped cable on the connector such that the signal line, the shield wires, and the outer sheath are placed on the signal line connection portion, the shield wires crimping portion, and the outer sheath retention portion and inserting the barrel anvil into the jig inlet to connect the signal line to the signal line connection portion while using the crimping jig to press the crimping tabs to the shield wires and the outer sheath. This makes it possible to connect a great number of connectors continuously and automatically. In addition, the signal and shield terminals are integrated so that an excellent shielding effect is obtained.

Claims

1. An electrical connector (1) comprising
 - a shielding case (3) having a barrel retention portion (6), a shield wire crimping portion (7), an outer sheath crimping portion (8) and a shield terminal (19);
 - a signal line barrel (5) having a signal terminal (14) and a signal line connection portion (15); and
 - an insulation body (4) provided within said barrel retention portion (6) so that said shield terminal and said signal terminal extend forwardly from a front end thereof,**characterized** in that
 - said electrical connector is a shielded cable board-in connector for direct mounting on a printing circuit board (28);
 - said barrel retention portion (6) having at its rear portion an opening (10) for inserting die means (24, 25) to receive connection between said signal line connection portion (15) and the signal line (20) of the shielded cable (2);

- said shield terminal (19) extending forwardly from a bottom of said shielding case (3) to form a first pin which is insertable through and directly solderable to a first plated through hole of said printing circuit board (28);
 - said signal terminal (14) extending forwardly from the front end of said signal line barrel (5) to form a second pin which is insertable through and directly solderable to a second plated through hole of said printed circuit board (28); and
 - said insulation body (4) within said barrel retention portion (6) supporting said signal line barrel (5) such that said signal line connection portion (15) is positioned in said opening (10a, 10b).
2. The electrical connector according to claim 1, wherein said opening comprising a pair of diametrically opposed inlets (10a, 10b) through which a pair of crimping dies (24a, 25a) are insertable to press said signal line connection portion (15) onto said signal line (20).
 3. The electrical connector according to claim 1 or 2, wherein said signal line connecton portion (15) having a pair of first U-shaped crimping taps opening upwardly and an insulator crimping portion (16) having a pair of second U-shaped crimping taps opening upwardly.
 4. The electrical connector according to claim 1, wherein said signal line connection portion (15) having an insulation displacement portion (33) and an insulator crimping portion (16); said insulator crimping portion having a U-shaped crimping tab opening upwardly; said opening comprising an upper inlet (10a) through which a die (24a) is insertable to press said signal line (20) onto said insulation displacing portion (33) for effecting connection by insulation displacement.
 5. The electrical connector according to claim 4, wherein said insulation body (4) extends rearwardly up to said signal line barrel (5).

Patentansprüche

1. Elektrischer Verbinder (1) mit
 - einem Abschirmgehäuse (3) mit einem röhrenförmigen Halteteil (6), einem Quetschverbundbereich (7) für die Abschirmdrähte, einem Quetschverbundbereich (8) für die äußere Abschirmung, und einem Abschirmungsanschluß (19);
 - einer tonnenförmigen Signalleitungshalte-

rung (5) mit einem Signalanschluß (14) und einem Verbindungsabschnitt (15) für die Signalleitung; und

- einem Isolierkörper (4), der so in dem röhrenförmigen Halteteil (6) vorgesehen ist, daß der Abschirmungsanschluß und der Signalanschluß sich von einem vorderen Ende desselben aus nach vorn erstrecken,

dadurch gekennzeichnet, daß

- der elektrische Verbinder einen abgeschirmten Kabelanschluß zur Zuleitung zu einer Platine (28) zur direkten Montage auf dieser darstellt;
- das röhrenförmige Halteteil (6) in seinem rückwärtigen Bereich eine Öffnung (10) zur Einführung von Werkzeugeinrichtungen (24, 25) zur Aufnahme einer Verbindung zwischen dem Verbindungsabschnitt (15) und der Signalleitung (20) des abgeschirmten Kabels (2) aufweist;
- der sich von einem Unterteil des Abschirmgehäuses (3) aus nach vorn erstreckende Abschirmungsanschluß (19) einen ersten Kontaktstift bildet, der durch eine erste galvanisch beschichtete Durchführung in der Platine (28) einführbar und direkt mit dieser verlötbar ist;
- der sich vom vorderen Ende der Signalleitungshalterung (5) aus nach vorn erstreckende Signalanschluß (14) einen zweiten Kontaktstift bildet, der durch eine zweite galvanisch beschichtete Durchführung in der Platine (28) einführbar und direkt mit dieser verlötbar ist; und
- daß der sich innerhalb des röhrenförmigen Halteteils (6) befindende Isolierkörper (4) die Signalleitungshalterung (5) in der Weise abstützt, daß der Verbindungsabschnitt (15) für die Signalleitung in der Öffnung (10a, 10b) positioniert ist.

2. Elektrischer Verbinder nach Anspruch 1, bei welchem die Öffnung ein Paar diametral gegenüber liegender Einführungen (10a, 10b) aufweist, durch welche ein Paar Werkzeuge (24a, 25a) zur Herstellung der Quetschverbindung so einführbar ist, daß der Verbindungsabschnitt (15) für die Signalleitung auf die Signalleitung (20) aufpreßbar ist.

3. Elektrischer Verbinder nach Anspruch 1 oder 2, bei welchem der Verbindungsabschnitt (15) für die Signalleitung ein Paar erster U-förmiger Quetschverbindungsfahnen aufweist, welche sich nach oben öffnen, sowie einen Quetschverbindungsabschnitt (16) für die Isolierung, welcher ein Paar zweiter U-förmiger und sich nach oben öffnender Quetschverbindungsfahnen auf-

weist.

4. Elektrischer Verbinder nach Anspruch 1, bei welchem der Verbindungsabschnitt (15) für die Signalleitung einen Ausweichbereich (33) zum Verlagern der Isolierung sowie einen Quetschverbindungs-
bereich (16) für die Isolierung aufweist, wobei der Quetschverbindungs-
bereich für die Isolierung eine sich nach oben öffnende U-förmige Quetschverbindungs-
fahne umfapt; und bei welchem die Öffnung eine obere Einführung (10a) aufweist, durch welche ein Werkzeug (24a) zum Aufpressen der Signalleitung (20) auf den Ausweichbereich (33) für die Isolierung einführbar ist, um die Verbindung unter Verlagerung der Isolierung herzustellen.
5. Elektrischer Verbinder nach Anspruch 4, bei welchem der Isolierkörper (4) sich nach hinten bis zur Signalleitungshalterung (5) erstreckt.

Revendications

1. Connecteur électrique (1) comprenant :
- un boîtier de blindage (3) ayant une partie de retenue de cosse (6), une partie de sertissage de fils de blindage (7), une partie de sertissage de gaine extérieure (8) et une borne de blindage (19) ;
 - une cosse de ligne de signal (5) ayant une borne de signal (14) et une partie de connexion de ligne de signal (15) ; et
 - un corps isolant (4) prévu à l'intérieur de ladite partie de retenue de cosse (6) de sorte que ladite borne de blindage et ladite borne de signal s'étendent vers l'avant à partir d'une extrémité avant de ce corps ;
- caractérisé en ce que :
- ledit connecteur électrique est un connecteur de câble blindé sur plaquette de circuit, pour montage direct sur une plaquette de circuit imprimé (28) ;
 - ladite partie de retenue de cosse (6) comporte, dans sa région arrière, une ouverture (10) pour l'insertion de moyens de serrage (24,25) afin d'effectuer la connexion entre ladite partie de connexion de ligne de signal (15) et la ligne de signal (20) du câble blindé (2) ;
 - ladite borne de blindage (19) s'étend vers l'avant à partir d'une base dudit boîtier de blindage (3), pour former une première broche qui est insérable dans un premier trou traversant métallisé de ladite plaquette de circuit imprimé (28) et directement soudable à ce trou ;
 - ladite borne de signal (14) s'étend vers l'avant à partir de l'extrémité avant de ladite cosse de ligne de signal (5) pour former une deuxième-

me broche qui est insérable dans un deuxième trou traversant métallisé de ladite plaquette de circuit imprimé (28) et directement soudable à ce trou ; et

- ledit corps isolant (4) prévu dans ladite partie de retenue de cosse (6) supporte ladite cosse de ligne de signal (5) de sorte que ladite partie de connexion de ligne de signal (15) est positionnée dans ladite ouverture (10a,10b).
2. Connecteur électrique suivant la revendication 1, dans lequel ladite ouverture comprend deux entrées diamétralement opposées (10a,10b) par lesquelles on peut insérer deux éléments de sertissage (24a,25a) pour presser ladite partie de connexion de ligne de signal (15) sur ladite ligne de signal (20).
3. Connecteur électrique suivant la revendication 1 ou 2, dans lequel ladite partie de connexion de ligne de signal (15) comporte une paire de premières pattes de sertissage en forme de U s'ouvrant vers le haut et une partie de sertissage d'isolant (16) ayant une paire de deuxièmees pattes de sertissage en forme de U s'ouvrant vers le haut.
4. Connecteur électrique suivant la revendication 1, dans lequel ladite partie de connexion de ligne de signal (15) comprend une partie de déplacement d'isolant (33) et une partie de sertissage d'isolant (16), ladite partie de sertissage d'isolant comporte une patte de sertissage en forme de U s'ouvrant vers le haut, et ladite ouverture comprend une entrée supérieure (10a) par laquelle on peut insérer un outil de pressage (24a) pour presser ladite ligne de signal (20) sur ladite partie de déplacement d'isolant (33) afin d'effectuer la connexion par déplacement de l'isolant.
5. Connecteur électrique suivant la revendication 4, dans lequel ledit corps isolant (4) s'étend vers l'arrière jusqu'à ladite cosse de ligne de signal (5).

FIG. 1

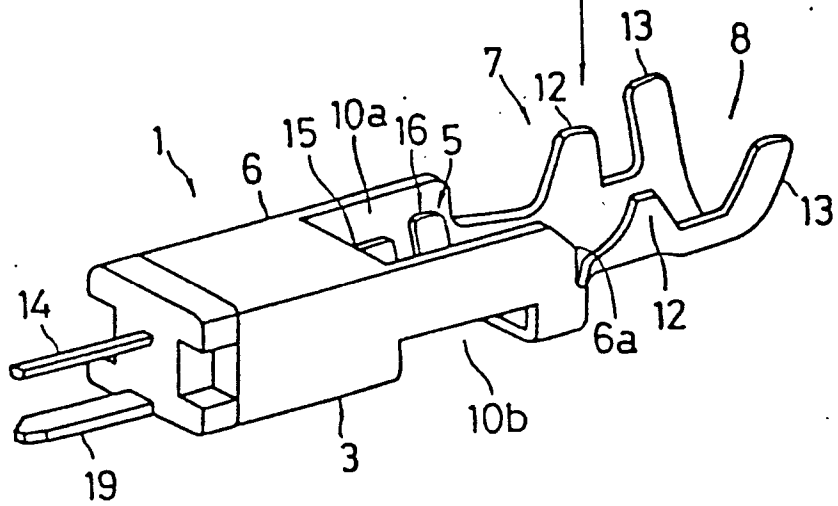
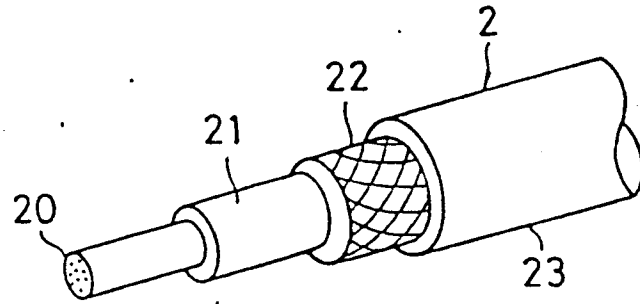


FIG. 2

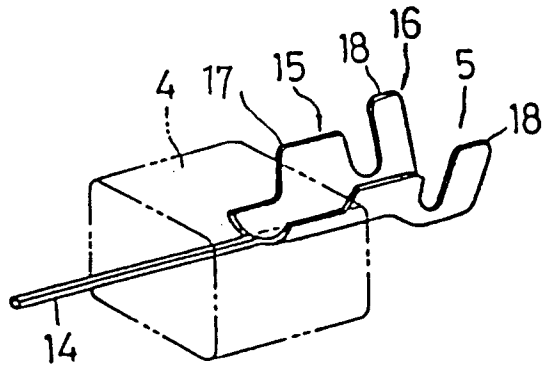


FIG. 3

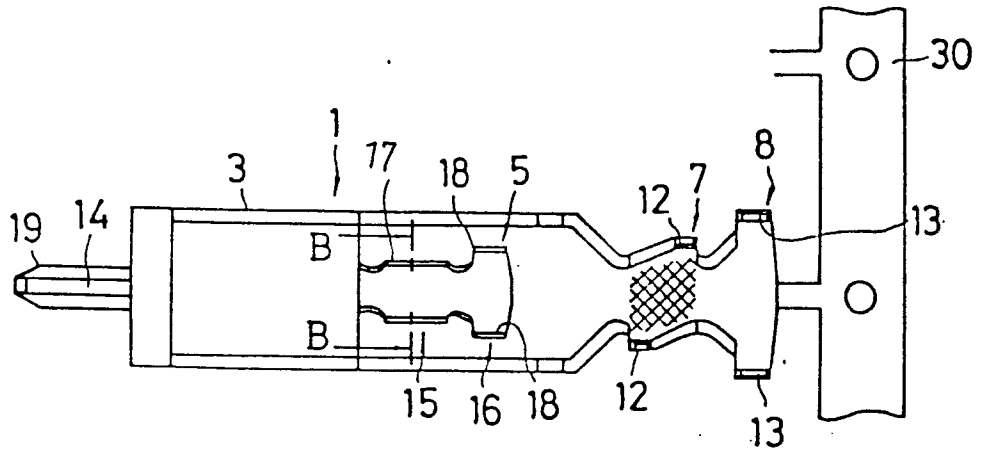


FIG. 4

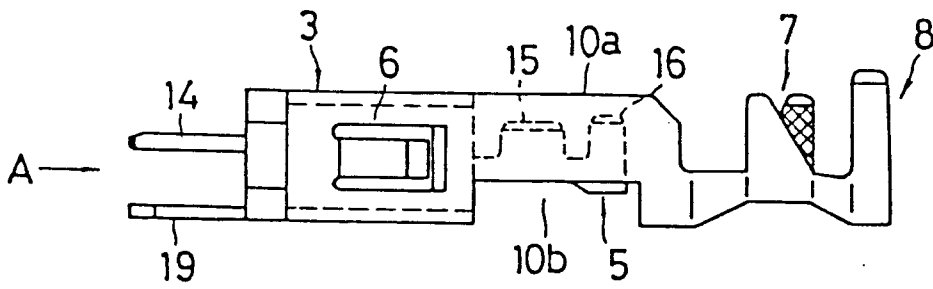


FIG. 5

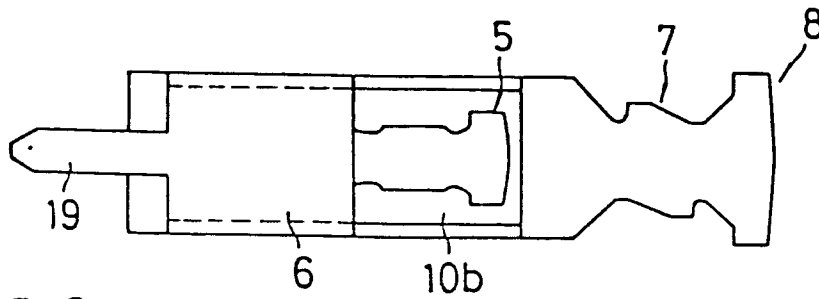


FIG. 6

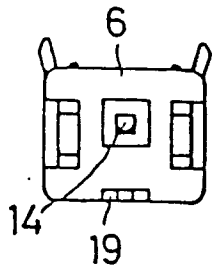


FIG. 7



FIG. 8

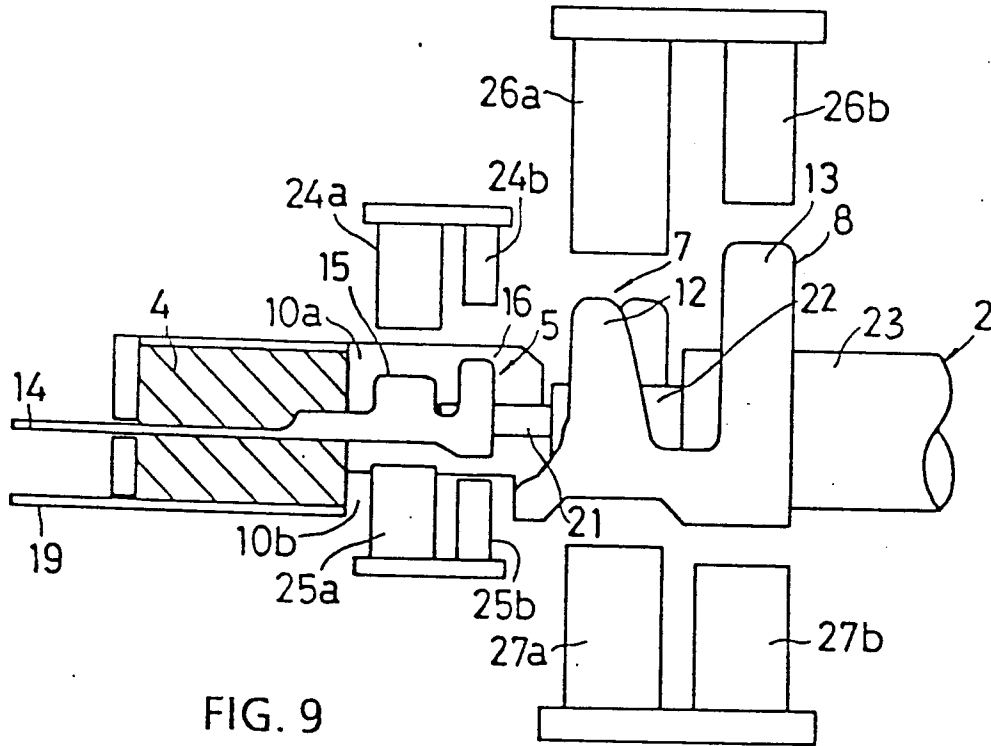


FIG. 9

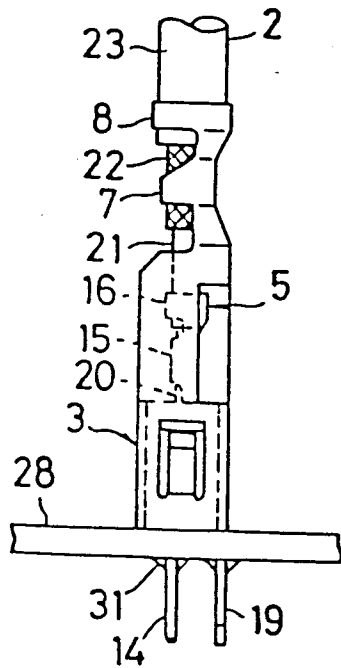


FIG. 10

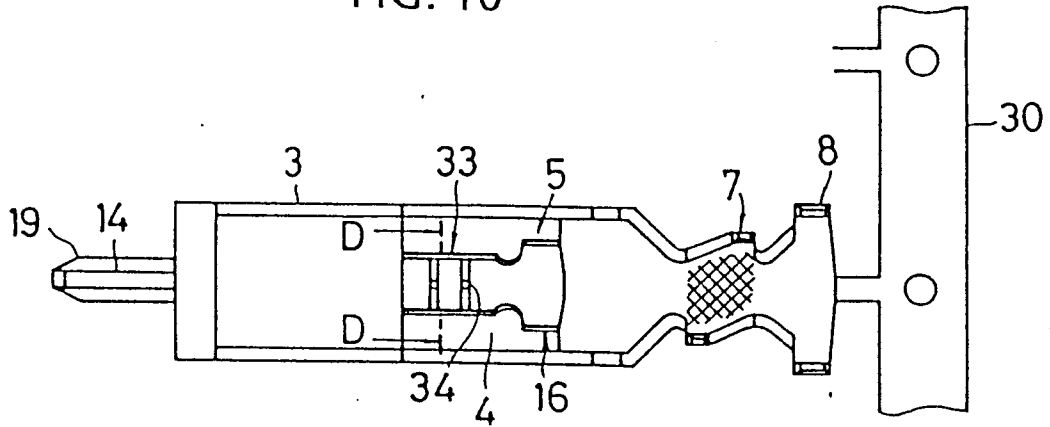


FIG. 11

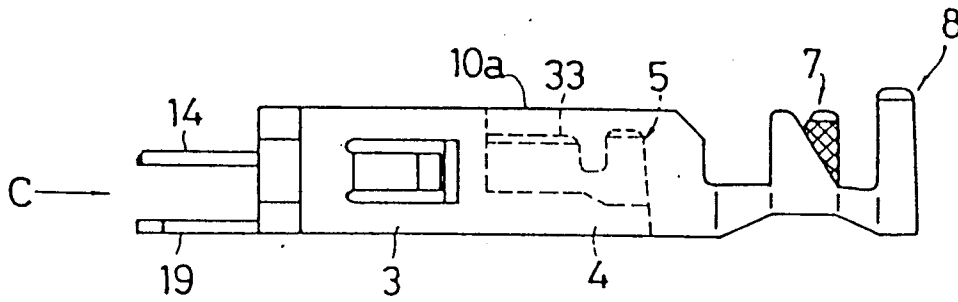


FIG. 12

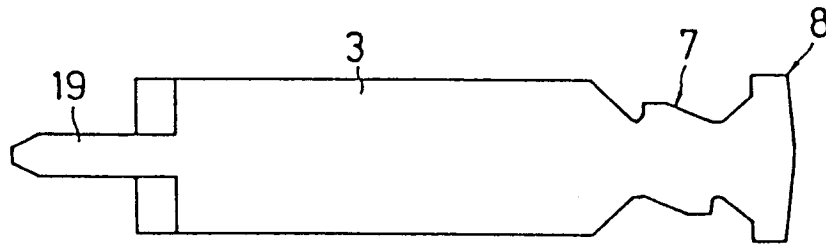


FIG. 13

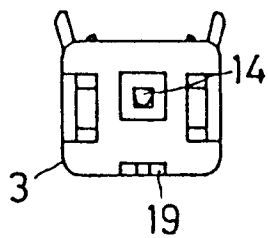


FIG. 14

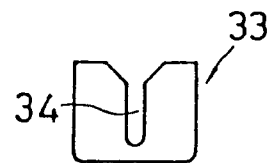


FIG. 15 PRIOR ART

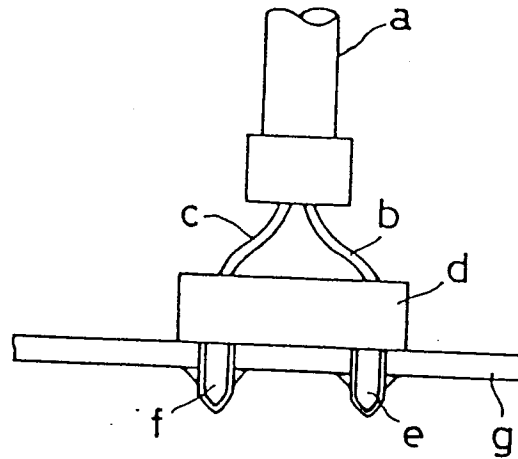


FIG. 16 PRIOR ART

