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(14) and a signal line connection portion (15); and an insulation body (4) provided within the barrel retention portion so that the shield and signal terminals extending forwardly from a front end thereof.

Background of the Invention

Field of the Invention

The present invention relates to shielded cable board-in connectors for electronic equipment of automobiles, for example.

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 a shielded cable board-in connector 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 there is provided a shielded cable board-in connector which includes a shielding case having a barrel retention portion, a shield wires crimping portion, an outer sheath crimping portion, and a shield terminal; a signal line barrel having a signal terminal and a signal line connection portion; and an insulation body provided within the barrel retention portion so that the shield and signal terminals extending forwardly

from a front end thereof.

According to the invention, the stripped front portion of a shielded cable is placed 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.

The above and other objects, features, and 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 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 15 and the other crimping tabs 18, 12, and 23 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. A shielded cable board-in connector comprising:

a shielding case having a barrel retention portion, a shield wires crimping portion, an outer sheath crimping portion, and a shield terminal;

a signal line barrel having a signal terminal and a signal line connection portion; and

an insulation body provided within barrel retention portion so that said shield and signal terminals extending forwardly from a front end

thereof.

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FIG. 1

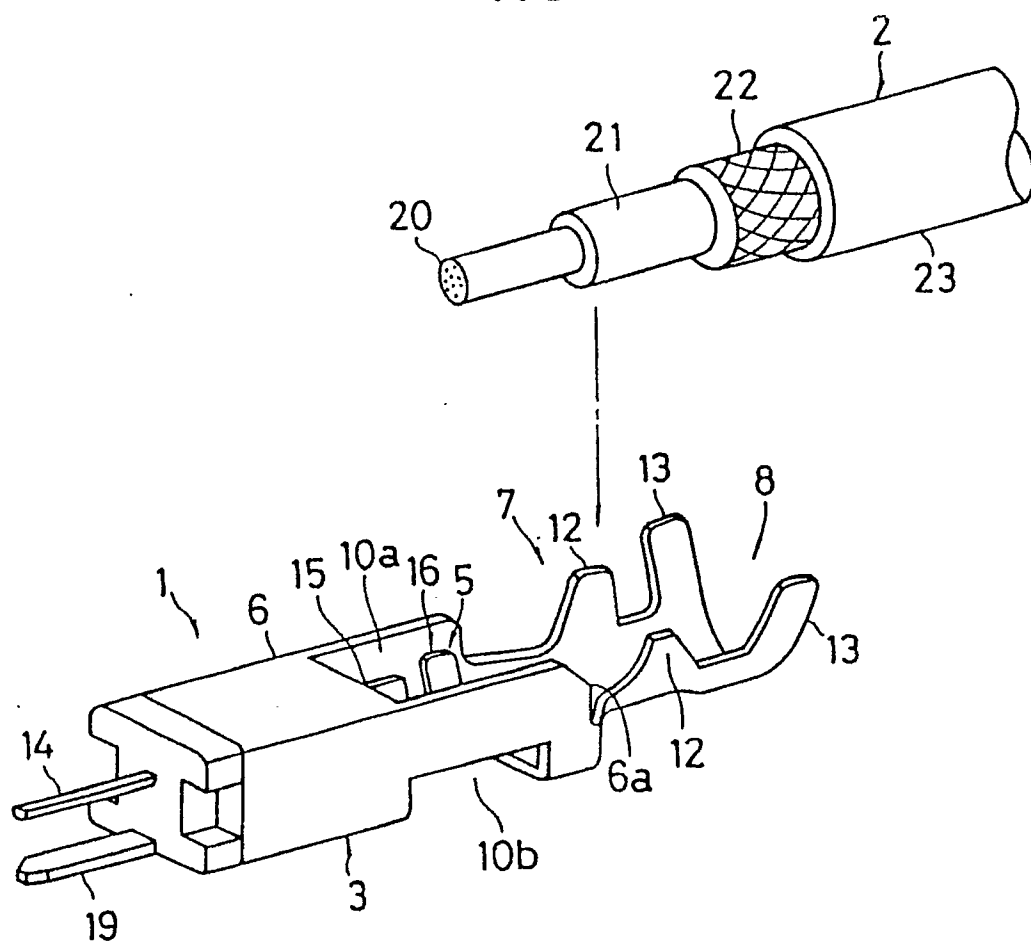


FIG. 2

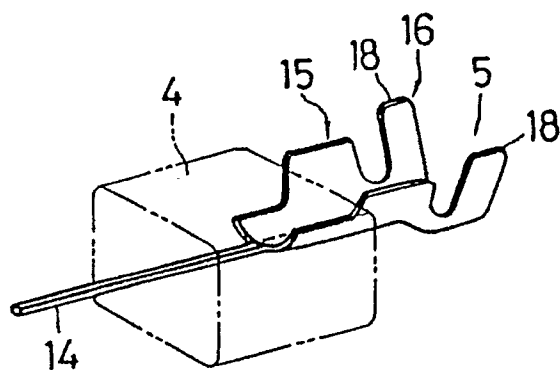


FIG. 3

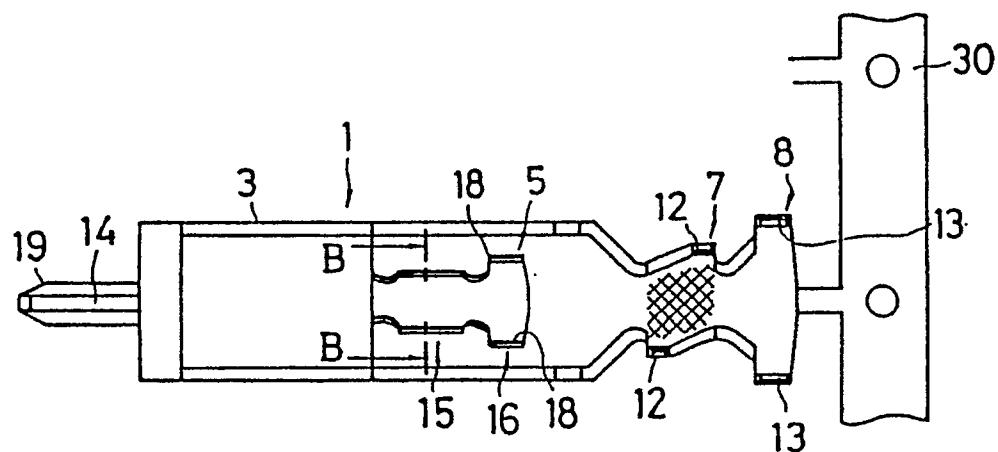


FIG. 4

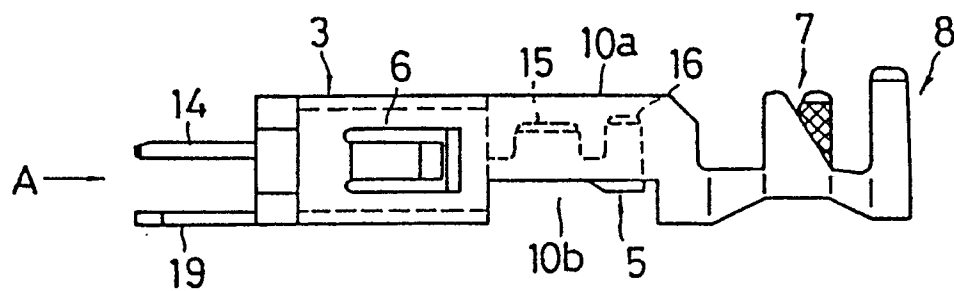


FIG. 5

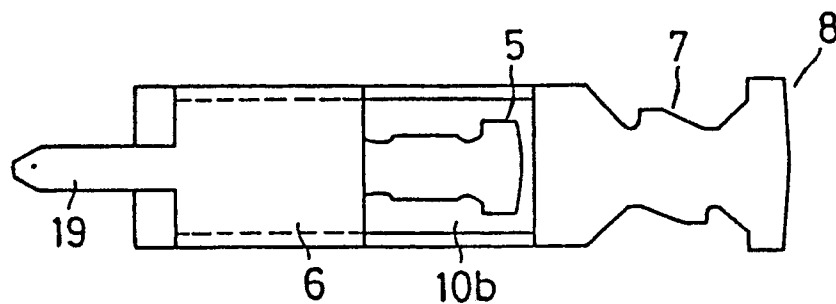


FIG. 6

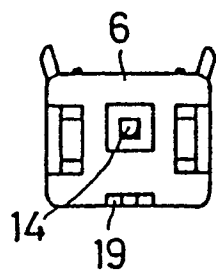


FIG. 7



FIG. 8

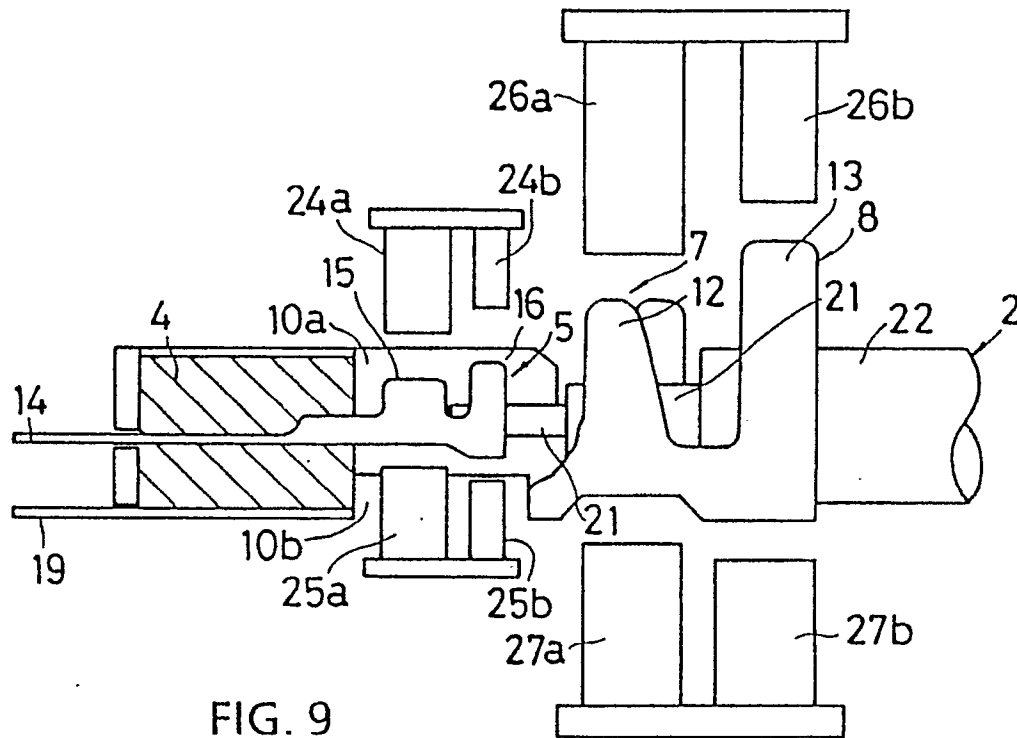


FIG. 9

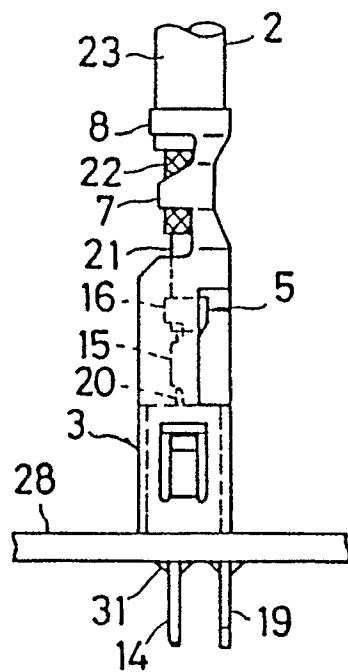


FIG. 10

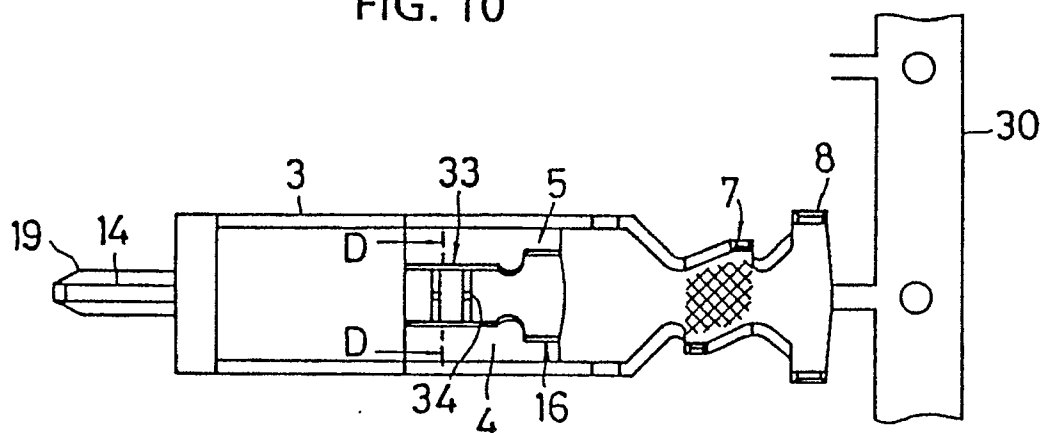


FIG. 11

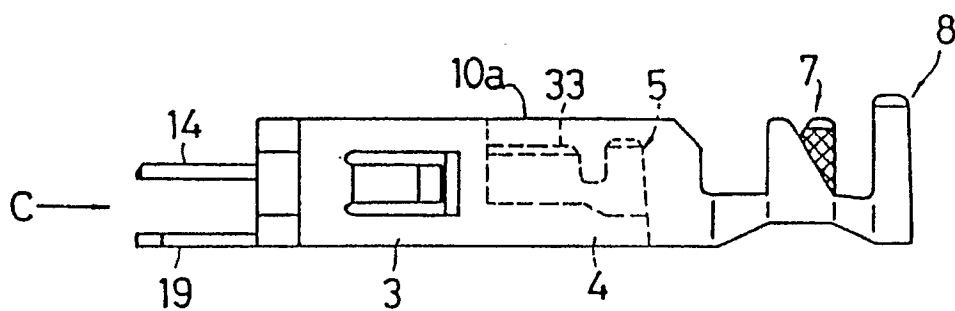


FIG. 12

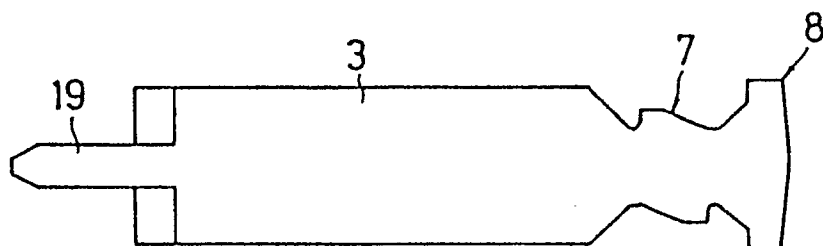


FIG. 13

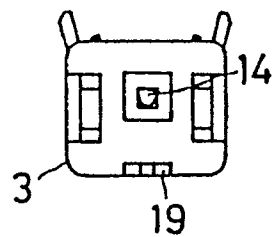


FIG. 14

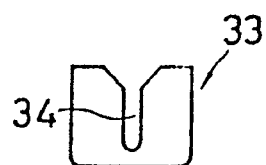


FIG. 15 PRIOR ART

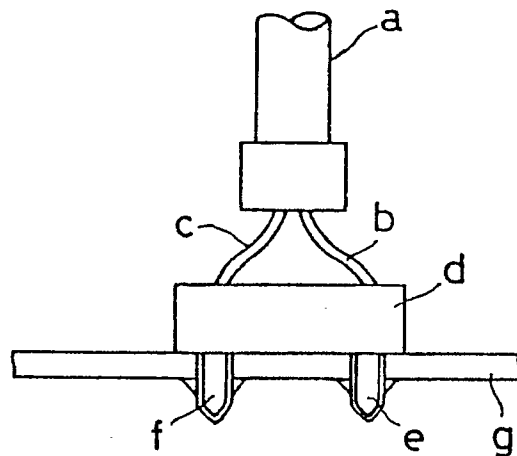
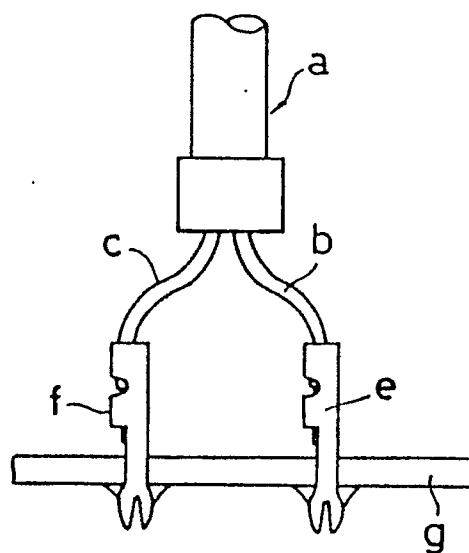


FIG. 16 PRIOR ART





European
Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 90 12 5744

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	GB-A-2 020 919 (SOURIAU) * page 1, lines 31-43,60-73; page 2, line 107 - page 3, line 7; page 3, lines 32-34,50-59,72-90,108-121; figures 1-13 * - - -	1	H 01 R 9/05
A	EP-A-0 000 996 (AMP) * page 4, lines 13-20; page 5, lines 8-12; figures 1,2 * - - -	1	
A	DE-A-2 510 299 (VEB ROBOTRON) * page 4, paragraphs 1,4; figure 1 * - - - - -	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			H 01 R 9/00 H 01 R 17/00 H 01 R 13/00
The present search report has been drawn up for all claims			
Place of search Berlin		Date of completion of search 29 May 91	Examiner ALEXATOS G
<div>CATEGORY OF CITED DOCUMENTS</div> <div>X: particularly relevant if taken alone Y: particularly relevant if combined with another document of the same category A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention</div> <div>E: earlier patent document, but published on, or after the filing date D: document cited in the application L: document cited for other reasons</div> <div>&: member of the same patent family, corresponding document</div>			