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(12) # EUROPEAN PATENT APPLICATION

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(54) **Electrical connecting apparatus.**

(57) A multi-core flat ribbon cable connector has a main body (2l) with two sets (22, 23) of connector pins projecting on one side for making IDC connections with conductors of respective cable parts (la, lb) and projecting on the other side for receiving free wiring blocks (3 and 4) can be readily effected.

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ELECTRICAL CONNECTING APPARATUS

BACKGROUND OF THE INVENTION

Field of the Invention

This invention relates to electrical connecting apparatus and especially to multi-core cable connectors.

Description of the Prior Art

Multi-core flat ribbon cable connectors are well known for effecting interfacing between electrical equipment especially between computers and peripheral equipment or between individual printed circuit boards in such equipment. Such connectors conveniently comprise flat plastic covered ribbon cable lengths the ends of which are fitted with connector terminals in the from of multi-pin plugs or sockets. Typically, such cables have forty or even sixty conductors and they are easily assembled as standard connectors in large numbers. One shortcoming relating to the use of such prefabricated connectors is that for certain applications the pins of one connector terminal are required to be connected to other than the geometrically corresponding pins of the plug or socket at the other end and the present invention seeks to provide means whereby this requirement may be achieved.

SUMMARY OF THE INVENTION

According to the present invention there is provided a multi-core cable connector assembly comprising a multi-core flat cable the ends of which are joined with predetermined arrangements of connections to respective terminal blocks or the like, the invention being characterized by said cable being in two parts joined via a connecting device provided with two sets of connecting elements for conductors of the respective parts and to receive wiring between them to provide a required arrangement of connections between the terminal blocks or the like.

This invention thus provides a connecting device in which standard elements can be used and specific arrangements of interconnecting patterns between various conductors can be achieved in a relatively simple manner.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure I illustrates in diagrammatical form a multi-core flat ribbon cable connector assembly in accordance with the invention.

Figure 2 illustrates on an enlarged scale a connecting device employed in Figure I.

Figure 3 illustrates a connecting pin on a further enlarged scale.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to Figure I, the flat cable connector comprises a multi-core flat plastic covered ribbon I extending between terminal blocks or the like 3 and 4 where they are connected with predetermined connection arrangements, the flat ribbon being separated into two parts I(a) and I(b) at an intermediate point and joined by a connecting device 2. The device 2 will be described in greater detail with reference to Figure 2 but it will be understood that it provides means whereby any pin of the terminal block 3 may be connected through free wiring to any other pin of the terminal block 4, thereby enabling a standard flat ribbon connector to be readily adapted for non-standard connection arrangements.

Referring to Figure 2, the connecting device 2 of Figure I comprises a main plastic multi-contact connecting block member 2I which carries two sets of pairs of staggered rows of connecting pins 22 and 23. Assuming that the flat ribbon cable connector is provided with forty conductors each of the four rows of connecting pins includes twenty pins. A typical such pin is shown in Figure 3 wherein it is seen that the upper end 24 is a normal wrap-around type, whereas the lower end 25 is a flat insulation displacment connection (IDC) type with a slot 26. Upper end 24 may alternatively be a solder pin or IDC type of contact. The block 2I thus has pins projecting upwards and the IDC portions projecting downwards whereby they are locatable in respective pairs of slots 45, 46 of a lower plastic moulded block 27. In order to positively locate the flat ribbon cable between the block 27 and the main terminal block 2I during the IDC process the surface of the block 27 between the respective slots 45, 46 is provided with cable locating ridges such as 28, 29. In order to separate one end of a flat ribbon cable from the other end during the IDC operation, the block 2I may have moulded into it a cutting element 30 of inverted "U" section extending across the full width thereof and providing two

downwardly projecting cutting edges 3l. To either side of the cutting edges 3l downward semicylindrical projections 32 and 33 are provided. Again, the lower block 27 has respective recesses 34, 35 and 36 for accepting the cutting element 3l and projections 32 and 33.

The upper surface 37 of the main block 2l is provided with upwardly extending portions such as 38 against which a snap-on cover 39 is able to engage when the whole is assembled. The spaces provided between the portions 38 accommodate free wiring (not shown) between the terminals 22 and 23 in accordance with the required connection arrangements. The two outermost of portions 38 are chamfered to afford easy assembly of the sufficiently springy plastic cover 39 which has inwardly projecting flanges 40 for snapping into engagement with rebates 4l extending along corresponding lower edges of the IDC block 27.

In operation, a standard multi-core flat ribbon connector with its terminal blocks or the like 3 and 4 already assembled to it in any known manner, such as by soldering or IDC, is laid across the lower block 27. Following this, the terminal block 2l is precisely positioned over the block 27, as by a suitable jig locating lugs 42 and 43. Sufficient compressive force is then applied to cause the sharp edges 3l to cut through the cable leaving a narrow strip which is subsequently readily withdrawn with pliers or the like. Alternatively, the cable can be pre-cut and inserted into the two parts of the connector. The compressive force is such as to effect IDC connection between the respective sets of pins 22 and 23 and the conductors of the separate cable parts thus produced. Free wiring is then effected between the pins 22 and 23 in accordance with the connection arrangement required for the particular special application of the connector and the cover 39 is snapped into position thereby holding the assembly together and producing a connector as shown in Figure l.

It can be seen that the present invention thus provides a connecting device in which standard connector elements are employed and specific arrangements of interconnecting patterns can be effected in a relatively simple manner.

Claims

l. A multi-core cable connector assembly comprising a multi-core flat cable (l) the ends of which are joined with predetermined arrangements of connections to respective terminal blocks or the like (3, 4) said connector assembly being characterized by said cable being in two parts (la, lb) joined via a connecting device (2) provided with two sets of connecting elements for conductors of the respective parts (la, lb) and to receive wiring between them to provide a required arrangement of connections between the terminal blocks or the like (3, 4).

2. A multi-core cable connector assembly as claimed in claim l, said connecting device (2) comprising a main member (2l) carrying two sets of connecting elements (22, 23) projecting on one side thereof to receive conductors of the cable parts (la, lb) and projecting on the other side thereof to receive said wiring.

3. A multi-core cable connector assembly as claimed in claim 2, including means (3l, 34) for severing said cable into two parts upon assembly thereto.

4. A multi-core cable connector assembly as claimed in claim 2, said connecting elements (22, 23) being of the insulation displacement type for connecting to the respective parts upon assembly.

5. A multi-core cable connector assembly as claimed in claim 3, including a cutter (3l) and a further member (27) shaped to co-operate with the cutter and separate said parts when said main member (2l) and said shaped member (27) are brought together.

6. A multi-core cable connector assembly as claimed in claim l, including a snap-on cover member (39) for holding the connecting device together.

7. A multi-core cable connector assembly as claimed in claim 2, wherein said connecting elements (22, 23) projecting from one side of said main member comprise insulation displacement contacts.

8. A multi-core cable connector assembly as claimed in claim 7, wherein said connecting device (2) includes a molded block (27) in engagement with said main member (2l) and receiving said contacts, said cable parts (la, lb) being located between said main member and said molded block.

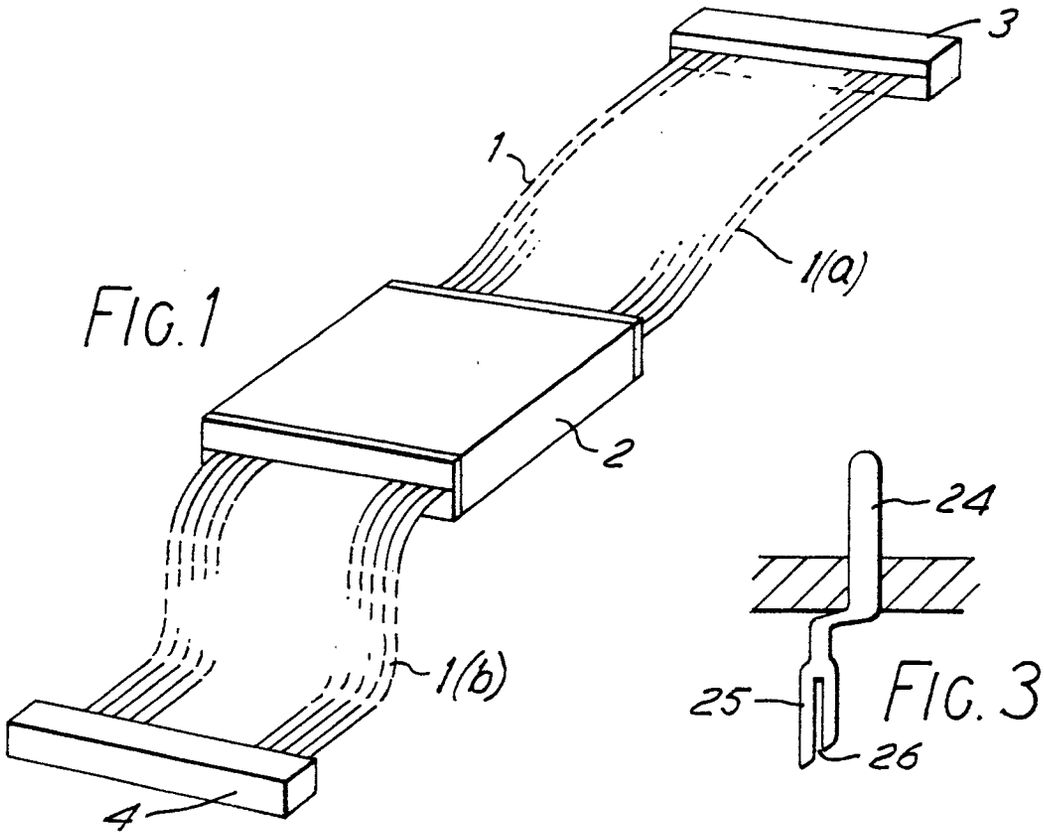

FIG. 1

FIG. 3

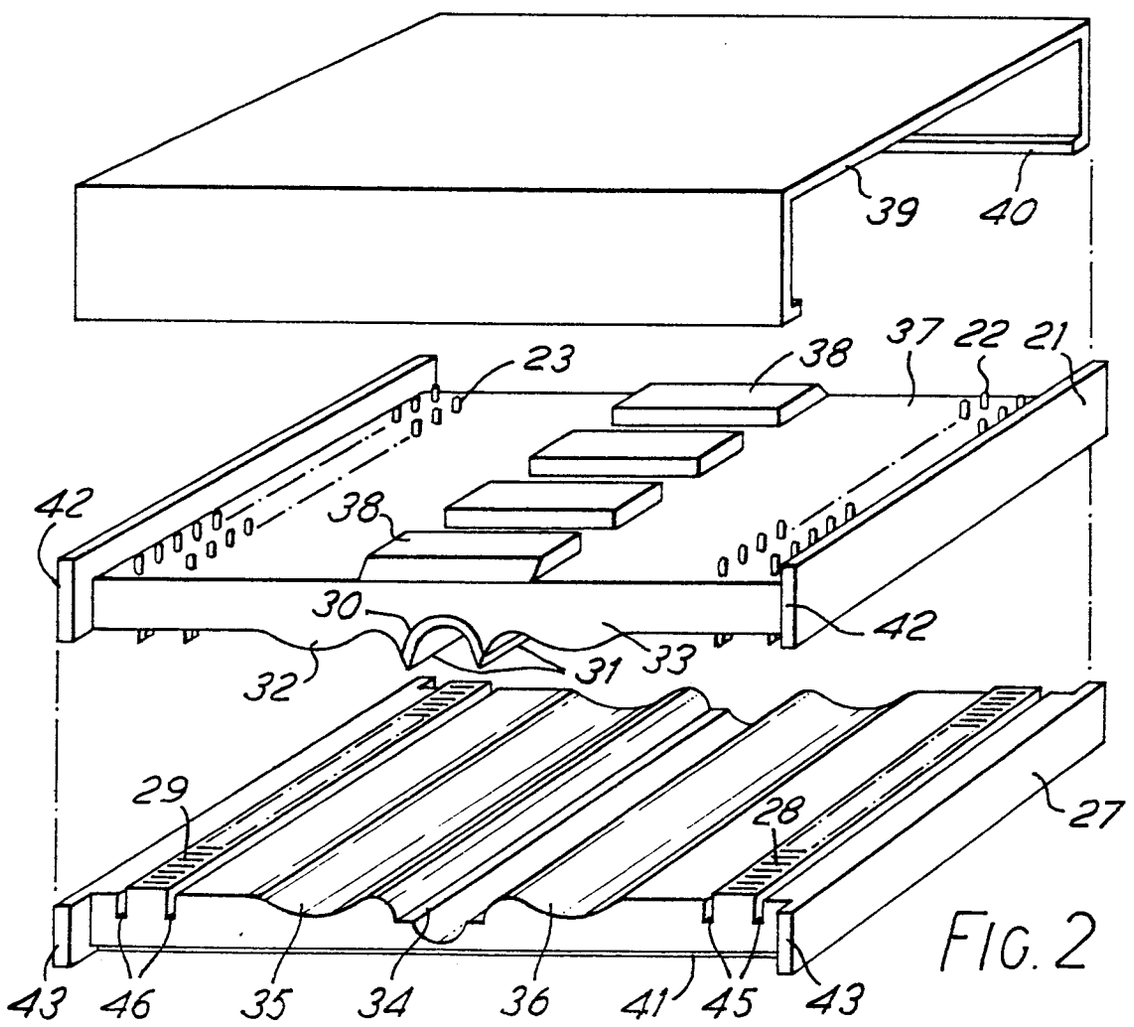

FIG. 2