

Electrical connector for flat cable

This invention relates to an electrical connector and particularly to an electrical connector for use in establishing electrical connections to the conductors of a flat cable of the type comprising a plurality of conductors held in spaced side-by-side parallel relationship by plastics insulating material.

In Dutch Patent Application No. 73/5305 (8233) there is described such a connector comprising a first housing member carrying a plurality of terminals each having a conductor-receiving portion projecting from a first face of the first housing member, the conductor-receiving portions of all the terminals all projecting in the same direction, and each comprising a pair of spaced arms extending normally of the first face of the first housing member, the arms having opposed edges defining a conductor-receiving slot and having pointed extremities for piercing the insulating material of the cable, and a second housing member having a plurality of holes extending inwardly from a first face thereof each to receive the arms of a respective one of the terminals carried by the first housing member when the two housing members are positioned with their respective first faces facing and with the cable located between their said faces with conductors of the cable received in the conductor-receiving slots of respective terminals, the arms of the conductor-receiving portion of each terminal being formed adjacent their free ends with outwardly directed projections which are an interference fit in the associated hole in the second housing member, the interference fit between the projections and the walls of the associated holes in the second housing member serving to latch the second housing member to the terminals and thus to the first housing member.

This known connector has the advantage that the first and second housing members are securely latched together with a cable therebetween by the engagement between the terminals and the second housing member, this preventing bowing of the second housing member, which can occur particularly with long connectors, such bowing possibly adversely affecting the connections between the terminals and the conductors of the cable.

According to this invention a connector as described above is characterised in that, in use, each arm of each terminal engages the second housing member not only at the projection on the arm but also at a second position adjacent the engagement between the arm and a conductor of the cable received in the slot partially defined by the arm.

The connector of this invention has the advantage that the second position of engagement between each arm of each terminal and the second housing member serves to relieve the stresses induced in the arms by the engage-

ment between the projections on the arms and the second housing member, this enhancing the contact between the arms and the conductors and ensuring reliable electrical connections.

A connector according to this invention will now be described by way of example with reference to the drawing in which:—

Figure 1 is a perspective view of the connector with part broken away and connected to a cable;

Figure 2 is a sectional view of part of the connector prior to assembly to a cable; and

Figure 3 is a view similar to Figure 2 but with the connector in the assembled state.

The connector to be described is for connection to a flat cable 100 of the type comprising a plurality of conductors 101 held in spaced side-by-side parallel relationship by plastics insulating material 102, and comprises a first housing member 1 moulded from electrically insulating plastics material and carrying a plurality of terminals 2 each stamped and formed from sheet metal and having a socket portion 3 contained in the housing member 1 for mating with a male contact (not shown), and a conductor-receiving portion 4 projecting from a first face of the housing member 1, the conductor-receiving portions 4 of all the terminals 2 (only one being shown in Figures 2 and 3) projecting in the same direction.

Each conductor-receiving portion 4 comprises a pair of spaced arms 5 extending normally of the first face of the housing member 1, the arms 5 having opposed edges defining a conductor-receiving slot 6, and having pointed extremities for piercing the insulating material 102 of the cable 100.

The connector also comprises a second housing member 7 moulded from electrically insulating plastics material and having a plurality of blind holes 8 extending inwardly from a first face thereof each to receive the arms 5 of a respective one of the terminals 2 when the two housing members 1 and 7 are positioned with their respective first faces facing and with the cable 100 located between their respective first faces with the conductors 101 of the cable 100 received in the conductor-receiving slots 6 of respective terminals 2.

The arms 5 of each terminal 2 are formed adjacent their free ends with outwardly directed projections 9 which are an interference fit in the associated hole 8 in the second housing member 7, the projections 9 biting into the wall of the associated hole 8 and thus serving to latch the second housing member 7 to the terminals 2 and thus to the first housing member 1 in the assembled state shown in Figures 1 and 3.

As clearly shown in Figure 2 each hole 8 has a first portion 10 of inwardly tapering cross-

tion, which serves to cam the arms 5 of the associated terminal 2 towards each other as the second housing member 7 is applied to the terminals 2, the tapering portion 10 leading into a second portion 11 of constant cross-section which serves to hold the arms 5 in a stressed condition (shown in Figure 3) with a conductor 101 received between them, and with the projections 9 biting into the wall of the hole 8. The projection 9 on each arm 5 thus defines a first position X of engagement between the arm 5 and the second housing member 7.

As previously mentioned, this engagement X and the stresses it causes in the arms 5 can adversely affect the contact between the arms 5 and the associated conductor 101, and thus in the connector of this invention the arms 5 and the hole 8 in the second housing member 7 are so dimensioned that there is a second position Y of engagement between each arm 5 and the second housing member 7 at the mouth of the hole 8, that is adjacent the engagement between the arm 5 and the conductor 101 received in the slot 6 partially defined by the arm 5, as clearly shown in Figure 3.

It has been found by stress analysis carried out on a connector according to this invention that the provision of the second position Y of engagement between each arm 5 and the second housing member 7 serves to reduce and disperse the stress concentrations in the arm 5 caused by the first position X of engagement between the projection 9 on the arm 5 and the second housing member 7, and between the arms 5 and the conductor 101, thereby enhancing the contact between the arms 5 and the associated conductor 101 while still maintaining the latching effect between projection 9 on the arms 5 and the second housing member 7.

Claims

1. An electrical connector for use in establishing electrical connections to the conductors of a flat cable (100) of the type comprising a plurality of conductors (101) held in spaced side-by-side parallel relationship by plastics insulating material (102), comprising a first housing member (1) carrying a plurality of terminals (2) each having a conductor-receiving portion (4) projecting from a first face of the first housing member, the conductor-receiving portions of all the terminals all projecting in the same direction, and each comprising a pair of spaced arms (5) extending normally of the first face of the first housing member, the arms having opposed edges defining a conductor-receiving slot (6) and having pointed extremities for piercing the insulating material of the cable, and a second housing member (7) having a plurality of holes (8) extending inwardly from a first face thereof each to receive the arms of a respective one of the terminals carried by the first housing member when the two

housing members are positioned with their respective first faces facing and with the cable located between their said faces with conductors of the cable received in the conductor-receiving slots of respective terminals, the arms (5) of the conductor-receiving portion of each terminal being formed adjacent their free ends with outwardly directed projections (9) which are an interference fit in the associated hole (8) in the second housing member (7) the interference fit between the projections (9) and the walls of the associated holes in the second housing member serving to latch the second housing member to the terminals and thus to the first housing member, characterised in that, in use, each arm (5) of each terminal (2) engages the second housing member (7) not only at the projection (9) on the arm (5) but also at a second position (Y) adjacent the engagement between the arm (5) and a conductor (101) of the cable (100) received in the slot (6) partially defined by the arm (5).

2. A connector as claimed in Claim 1, characterised in that each hole (8) in the second housing member (7) is a blind hole having a first portion (10) of inwardly tapering cross-section, leading into a second portion (11) of constant cross-section in which the projections (9) on the arms (5) of the associated terminal (2) are received in the assembled state of the connector.

Patentansprüche

1. Elektrischer Verbinder zur Herstellung elektrischer Verbindungen mit den Leitern eines Flachkabels (100), derjenigen Art, die eine Vielzahl von Leitern (101) umfaßt, die in seitlich beabstandeter paralleler Beziehung durch ein Plastik-Isoliermaterial (102) gehalten sind, mit einem ersten Gehäuseteil (1), das eine Vielzahl von Anschlüssen (2) trägt, von denen jeder einen Leitaraufnahmeteil (4) aufweist, der von einer ersten Fläche des ersten Gehäuseteils wegragt, wobei die Leitaraufnahmeteile aller Anschlüsse alle in der der gleichen Richtung ragen, und jeder ein Paar von beabstandeten Armen (5) aufweist, die sich senkrecht zu der ersten Fläche des ersten Gehäuseteils erstrecken, wobei ferner die Arme gegenüberstehende Ränder aufweisen, die einen Leitaraufnahmeschlitz (6) begrenzen und spitze äußere Enden aufweisen, um das Isoliermaterial des Kabels zu durchdringen, und mit einem zweiten Gehäuseteil (7), der eine Vielzahl von Löchern (8) aufweist, die sich einwärts von einer ersten Fläche erstrecken, um jeweils die Arme eines jeweiligen von dem ersten Gehäuseteil getragenen Anschlusses aufzunehmen, wenn die beiden Gehäuseteile derart positioniert werden, daß ihre jeweiligen ersten Flächen einander zugewandt sind und das Kabel zwischen diesen ihrer Flächen angeordnet ist, so daß die Leiter des Kabels in den Leitaraufnahmeschlitz der jeweiligen Anschlüsse auf-

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genommen sind, wobei ferner die Arme (5) des Leiteraufnahmetells jedes Anschlusses in der Nähe ihrer freien Enden mit auswärts gerichteten Vorsprüngen (9) geformt sind, die einen Festsitz in dem zugeordneten Loch (8) in dem zweiten Gehäuseteil (7) darstellen, und wobei der Festsitz zwischen den Vorsprüngen (9) und den Wänden der zugeordneten Löcher in dem zweiten Gehäuseteil dazu dient, das zweite Gehäuseteil mit den Anschlüssen und somit mit dem ersten Gehäuseteil zu verriegeln, dadurch gekennzeichnet, daß im Gebrauch jeder Arm (5) jedes Anschlusses (2) mit dem zweiten Gehäuseteil (7) nicht nur an dem Vorsprung (9) an dem Arm (5) im Eingriff steht, sondern auch an einer zweiten Position (Y) in der Nähe des Eingriffes zwischen dem Arm (5) und einem Leiter (101) des Kabels (100), der in dem teilweise durch den Arm (5) begrenzten Schlitz (8) aufgenommen ist.

2. Verbinder nach Anspruch 1, dadurch gekennzeichnet, daß jedes Loch (8) in dem zweiten Gehäuseteil (7) ein Blindlock ist, das einen ersten Teil (10) mit sich einwärts verjüngendem Querschnitt aufweist und in einen zweiten Teil (11) mit konstantem Querschnitt führt, in welchem die Vorsprünge (9) an den Armen (5) des zugeordneten Anschlusses (2) im zusammengebauten Zustand des Verbinders aufgenommen sind.

Revendications

1. Connecteur électrique destiné à être utilisé dans l'établissement de connexions électriques sur les conducteurs d'un câble plat (100) du type comprenant plusieurs conducteurs (101) maintenus espacés, côte à côte et parallèlement les uns aux autres par une matière plastique isolante (102), comprenant un premier élément (1) de boîtier portant plusieurs bornes (2) ayant chacune une partie (4) de réception d'un conducteur faisant saillie d'une première face du premier élément de boîtier, les parties de réception de conducteurs de toutes les bornes faisant toutes saillie dans la même

direction, et comprenant chacune deux bras espacés (5) s'étendant perpendiculairement à la première face du premier élément de boîtier, les bras présentant des bords opposés définissant une fente (6) de réception d'un conducteur et ayant des extrémités pointues pour percer la matière isolante du câble, et un second élément (7) de boîtier ayant plusieurs trous (8) partant vers l'intérieur d'une première face de cet élément pour recevoir chacun les bras de l'une, correspondante, des bornes portées par le premier élément de boîtier lorsque les deux éléments de boîtier sont positionnés avec leurs premières faces respectives tournées l'une vers l'autre et avec le câble placé entre lesdites faces, les conducteurs du câble étant logés dans les fentes de réception des conducteurs des bornes respectives; les bras (5) de la partie de réception de conducteur de chaque borne étant formés, à proximité de leurs extrémités libres, avec des saillies (9) dirigées vers l'extérieur qui s'ajustent étroitement dans le trou associé (8) du second élément (7) de boîtier, l'ajustement étroit entre les saillies (9) et les parois des trous associés du second élément de boîtier servant à verrouiller le second élément de boîtier sur les bornes et donc sur le premier élément de boîtier, caractérisé en ce que, en cours d'utilisation, chaque bras (5) de chaque borne (2) s'enclenche avec le second élément (7) de boîtier non seulement par la saillie (9) du bras (5), mais également dans une seconde position (Y) adjacente à l'enclenchement entre le bras (5) et un conducteur (101) du câble (100) logé dans la fente (6) partiellement définie par le bras (5).

2. Connecteur selon la revendication 1, caractérisé en ce que chaque trou (8) du second élément (7) de boîtier est un trou borgne ayant une première partie (10) dont la section s'aminuit vers l'intérieur, conduisant à une seconde partie (11) de section constante dans laquelle les saillies (9) des bras (5) de la borne associée (2) sont logées dans l'état assemblé du connecteur.



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