

Description

This invention relates to an electrical connector comprising a housing carrying a plurality of receptacle contacts for mating with a corresponding plurality of male contacts.

With such electrical connectors of small size, for example connectors in which the pitch distance between adjacent receptacle contacts in a row thereof is smaller than 2.5 mm, difficulties arise in compensating for manufacturing tolerances.

Such tolerances are substantially the same whatever the size of a connector, and are therefore of more significance with a smaller connector. While such tolerances can be compensated for in a large connector relatively easily, compensation is difficult to obtain in a small size connector where a permitted, or the lowest possible, manufacturing tolerance may be large relative to a critical dimension of the connector.

A particular problem which occurs is a misalignment between the male-contact-receiving openings of one or more of the receptacle contacts and the associated male contact or contacts of the mating array thereof. Such misalignment can make it impossible for the connector to be mated with the array of male contacts, or can result in mating being achieved only with damage to one or more of the contacts.

FR—A—1 354 127 discloses an electrical connector comprising a housing carrying a plurality of receptacle contacts for mating with a corresponding plurality of male contact posts, in which each receptacle contact comprises a receptacle portion defining an opening to receive a mating male contact post; a mounting portion by which the receptacle contact is mounted in the housing; and an intermediate portion by which the receptacle portion is connected to the mounting portion and which permits movement of the receptacle portion relative to the mounting portion within the housing. the receptacle portion of each receptacle contact comprising a pair of opposed resilient arms joined by a bight portion, the free ends of the arms together defining a male contact-receiving opening, the intermediate portion comprising a single resilient straight arm extending from the mounting portion to the bight portion, the complete receptacle contact being stamped and formed from a single piece of sheet metal.

It is an object of the invention to provide an improved electrical connector having the aforesaid known features.

Accordingly the invention is characterised in that the single resilient straight arm of each receptacle contact extends from the mounting portion substantially parallel to the bight portion, and is connected to the bight portion at the junction between one of the arms and the bight portion, the one arm being the arm which is more distant from the mounting portion than the other arm, and the mounting portion being immovably contained in the housing in a press-fit manner, the receptacle portion being capable of limited

movement relative to the mounting portion by virtue of the resilient straight arm.

Suitably the mounting portion of each receptacle contact has a wire connection portion by which a wire can be connected to the receptacle contact.

In an embodiment, the mounting portion has at least one laterally extending end, the wire connection portion comprising at least one wire-receiving slot in the laterally extending end.

An electrical connector according to this invention will now be described by way of example with reference to the drawing which is a perspective view of the connector with part broken away together with a mating male contact array.

Referring to the drawing, the connector comprises a housing 1 molded from electrically insulating plastics material and having a plurality of cavities 2 arranged in a row, each to receive a receptacle contact 3.

The connector is for mating with a printed circuit board header comprising a row of male contact posts 100 carried by a housing 101 molded from electrically insulating plastics material, each post 100 having a mounting portion 102 for receipt in a hole in a printed circuit board (not shown), and a contact portion 103 for mating with an associated one of the receptacle contacts 3.

The housings 1 and 101 are shaped to mate with each other with the contacts 3 and 100 carried thereby mated, the housing 1 being formed with a longitudinally extended rounded rib 4 which is received in a correspondingly shaped groove 104 in the housing 101 to secure the housings together in the mated condition.

Each receptacle contact 3 is stamped and formed, in known manner, from a single piece of sheet metal, and comprises a receptacle portion 5 comprising a pair of opposed arms 6 and 7 joined by a bight portion 8 to form a substantially U-shaped receptacle portion, the free ends of the arms 6 and 7 together defining a male-contact-receiving opening 9 for receiving one of the male contact posts 100 to be gripped between the free ends of the arms 6 and 7. The opening 9 of the contact 3 is aligned with a hole 10 in the housing 1 through which hole 10 the post 100 enters the opening 9.

Each receptacle contact 3 also comprises a mounting portion 11 by which the contact 3 is secured in its cavity 2 in the housing 1, the mounting portion 11 comprising a plate 12 having opposed end portions 13 and 14 bent at right angles thereto and in the same direction relative thereto, the free edges of the end portions 13 and 14 being formed with projections 15 which engage a wall of the housing 1 and urge the plate 12 against an opposite wall of the housing 1 to secure the contact 3 in its cavity 2 in the housing 1 in a press fit manner.

The mounting portion 11 of each receptacle contact 3 also constitutes a wire connection portion by which a wire can be connected to the receptacle contact 3, in that each end portion 13

and 14 is formed with a slot 16 or 17 into which an insulated wire (not shown) can be urged transversely of its axis, in known manner, the slot 17 being sized such that the insulation of the wire is penetrated and the conductive core of the wire gripped by the walls of the slot 17 to give an electrical connection, and the slot 16 being sized to grip the insulation of the wire to provide strain relief for the electrical connection provided by the slot 17, all in known manner.

The receptacle portion 5 of each receptacle contact 3 is connected to the mounting portion 11 thereof by an intermediate portion 18 comprising a single straight resilient arm which is connected to the receptacle portion 5 of the receptacle contact 3 adjacent the junction between the arm 6 and the bight portion 8 of the receptacle portion 5. The resilient intermediate portion 18 of each receptacle contact 3 permits movement of the receptacle portion 5 relative to the mounting portion 11, and since the mounting portion is fixed against movement relative to the housing 1, the movement of the receptacle portion 5 is also relative to the housing 1, the cavity 2 in the housing 1 being sized to permit such movement of the receptacle portion 5.

Thus, the receptacle portions 5 of the receptacle contacts 3 are capable of relative movement in their cavities 2 in the housing 1, and in the event that on mating of the receptacle contacts 3 with the associated male post contacts 100, one or more of the receptacle contact openings 9 is not in correct alignment with the associated post 100, the engagement between that post 100 and the arms 6 and 7 of the associated receptacle portion 5 can move the receptacle portion 5 within its cavity 2 to achieve correct and accurate mating between the post 100 and the receptacle portion 5, without affecting the mating of other posts 100 and their associated receptacle portions 5, and without damaging any of the contacts.

Claims

1. An electrical connector comprising a housing (1) carrying a plurality of receptacle contacts (3) for mating with a corresponding plurality of male contact posts (100), in which each receptacle contact (3) comprises a receptacle portion (5) defining an opening (9) to receiving a mating male contact post (100); a mounting portion (11) by which the receptacle contact is mounted in the housing (1); and an intermediate portion (18) by which the receptacle portion (5) is connected to the mounting portion (11) and which permits movement of the receptacle portion relative to the mounting portion within the housing, the receptacle portion (5) of each receptacle contact comprising a pair of opposed resilient arms (6, 7) joined by a bight portion (8), the free ends of the arms together defining a male contact-receiving opening (9), the intermediate portion (18) comprising a single resilient straight arm extending from the mounting portion (11) to the bight portion (8), the complete receptacle contact (3)

being stamped and formed from a single piece of sheet metal, characterised in that the single resilient straight arm (18) of each receptacle contact extends from the mounting portion (11) substantially parallel to the bight portion (8); and is connected to the bight portion (8) at the junction between one of the arms (6) and the bight portion (8), the one arm (6) being the arm which is more distant from the mounting (11) portion than the other arm, and the mounting portion (11) being immovably contained in the housing (1) in a press-fit manner, the receptacle portion (5) being capable of limited movement relative to the mounting portion (11) by virtue of the resilient straight arm (18).

2. A connector as claimed in claim 1, characterised in that the mounting portion (11) of each receptacle contact also has a wire connection portion (16, 17) by which a wire can be connected to the receptacle contact.

3. A connector as claimed in claim 1 or claim 2 characterised in that the mounting portion (11) has at least one laterally extending end 13, the wire connection portion (16) comprising at least one wire-receiving slot in the laterally extending end.

4. A connector as claimed in any preceding claim characterised in that the receptacle contacts (3) are disposed at a pitch of less than 2.5 mm.

Patentansprüche

1. Elektrischer Verbinder mit einem Gehäuse (1), das eine Vielzahl von Aufnahmekontakten (3) zum Zusammenfügen mit einer entsprechenden Vielzahl von eindringenden Kontaktstiften (100) trägt, wobei jeder Aufnahmekontakt (3) einen Aufnahmeabschnitt (5) umfaßt, der eine Öffnung (9) zur Aufnahme eines einzufügenden eindringenden Kontaktstiftes (100) begrenzt, ferner mit einem Montageabschnitt (11), durch den der Aufnahmekontakt in dem Gehäuse (1) montiert ist, und mit einem mittleren Abschnitt (18), mit dem der Aufnahmeabschnitt (5) mit dem Montageabschnitt (11) verbunden ist und der eine Bewegung des Aufnahmeabschnitts relativ zum Montageabschnitt innerhalb des Gehäuses gestattet, wobei ferner der Aufnahmeabschnitt (5) jedes Aufnahmekontakts ein Paar von gegenüberstehenden elastischen Armen (6, 7) umfaßt, die durch einen Schleifenabschnitt (8) miteinander verbunden sind, und wobei die freien Enden der Arme miteinander eine Aufnahmeöffnung (9) für den eindringenden Kontakt begrenzen, wobei der mittlere Abschnitt (18) einen einzigen, elastischen, geraden Arm umfaßt, der sich von dem Montageabschnitt (11) zum Schleifenabschnitt (8) erstreckt und der vollständige Aufnahmekontakt (3) aus einem einzigen Stück Metallblech gestanz und geformt ist, dadurch gekennzeichnet, daß der einzige elastische, gerade Arm (18) jedes Aufnahmekontakts sich von dem Montageabschnitt (11) im wesentlichen parallel zum Schleifenabschnitt (8) erstreckt und mit dem Schleifenabschnitt (8) an der Verbindungsstelle zwischen

and 14 is formed with a slot 16 or 17 into which an insulated wire (not shown) can be urged transversely of its axis, in known manner, the slot 17 being sized such that the insulation of the wire is penetrated and the conductive core of the wire gripped by the walls of the slot 17 to give an electrical connection, and the slot 16 being sized to grip the insulation of the wire to provide strain relief for the electrical connection provided by the slot 17, all in known manner.

The receptacle portion 5 of each receptacle contact 3 is connected to the mounting portion 11 thereof by an intermediate portion 18 comprising a single straight resilient arm which is connected to the receptacle portion 5 of the receptacle contact 3 adjacent the junction between the arm 6 and the bight portion 8 of the receptacle portion 5. The resilient intermediate portion 18 of each receptacle contact 3 permits movement of the receptacle portion 5 relative to the mounting portion 11, and since the mounting portion is fixed against movement relative to the housing 1, the movement of the receptacle portion 5 is also relative to the housing 1, the cavity 2 in the housing 1 being sized to permit such movement of the receptacle portion 5.

Thus, the receptacle portions 5 of the receptacle contacts 3 are capable of relative movement in their cavities 2 in the housing 1, and in the event that on mating of the receptacle contacts 3 with the associated male post contacts 100, one or more of the receptacle contact openings 9 is not in correct alignment with the associated post 100, the engagement between that post 100 and the arms 6 and 7 of the associated receptacle portion 5 can move the receptacle portion 5 within its cavity 2 to achieve correct and accurate mating between the post 100 and the receptacle portion 5, without affecting the mating of other posts 100 and their associated receptacle portions 5, and without damaging any of the contacts.

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being stamped and formed from a single piece of sheet metal, characterised in that the single resilient straight arm (18) of each receptacle contact extends from the mounting portion (11) substantially parallel to the bight portion (8); and is connected to the bight portion (8) at the junction between one of the arms (6) and the bight portion (8), the one arm (6) being the arm which is more distant from the mounting (11) portion than the other arm, and the mounting portion (11) being immovably contained in the housing (1) in a press-fit manner, the receptacle portion (5) being capable of limited movement relative to the mounting portion (11) by virtue of the resilient straight arm (18).

2. A connector as claimed in claim 1, characterised in that the mounting portion (11) of each receptacle contact also has a wire connection portion (16, 17) by which a wire can be connected to the receptacle contact.

3. A connector as claimed in claim 1 or claim 2 characterised in that the mounting portion (11) has at least one laterally extending end 13, the wire connection portion (16) comprising at least one wire-receiving slot in the laterally extending end.

4. A connector as claimed in any preceding claim characterised in that the receptacle contacts (3) are disposed at a pitch of less than 2.5 mm.

Patentansprüche

1. Elektrischer Verbinder mit einem Gehäuse (1), das eine Vielzahl von Aufnahmekontakten (3) zum Zusammenfügen mit einer entsprechenden Vielzahl von eindringenden Kontaktstiften (100) trägt, wobei jeder Aufnahmekontakt (3) einen Aufnahmeabschnitt (5) umfaßt, der eine Öffnung (9) zur Aufnahme eines einzufügenden eindringenden Kontaktstiftes (100) begrenzt, ferner mit einem Montageabschnitt (11), durch den der Aufnahmekontakt in dem Gehäuse (1) montiert ist, und mit einem mittleren Abschnitt (18), mit dem der Aufnahmeabschnitt (5) mit dem Montageabschnitt (11) verbunden ist und der eine Bewegung des Aufnahmeabschnitts relativ zum Montageabschnitt innerhalb des Gehäuses gestattet, wobei ferner der Aufnahmeabschnitt (5) jedes Aufnahmekontakts ein Paar von gegenüberstehenden elastischen Armen (6, 7) umfaßt, die durch einen Schleifenabschnitt (8) miteinander verbunden sind, und wobei die freien Enden der Arme miteinander eine Aufnahmeöffnung (9) für den eindringenden Kontakt begrenzen, wobei der mittlere Abschnitt (18) einen einzigen, elastischen, geraden Arm umfaßt, der sich von dem Montageabschnitt (11) zum Schleifenabschnitt (8) erstreckt und der vollständige Aufnahmekontakt (3) aus einem einzigen Stück Metallblech gestanz und geformt ist, dadurch gekennzeichnet, daß der einzige elastische, gerade Arm (18) jedes Aufnahmekontakts sich von dem Montageabschnitt (11) im wesentlichen parallel zum Schleifenabschnitt (8) erstreckt und mit dem Schleifenabschnitt (8) an der Verbindungsstelle zwischen



einem der Arme (6) und dem Schleifenabschnitt (8) verbunden ist, daß der eine Arm (6) derjenige Arm ist, der weiter von dem Montageabschnitt (11) entfernt ist, als der andere Arm, und daß der Montageabschnitt (11) unbeweglich in dem Gehäuse (1) im Preßsitz enthalten ist, wobei der Aufnahmeabschnitt (5) eine begrenzte Bewegung relativ zum Montageabschnitt (11) ausführen kann, und zwar aufgrund des elastischen geraden Arms (18).

2. Verbinder nach Anspruch 1, dadurch gekennzeichnet, daß der Montageabschnitt (11) jedes Aufnahmekontakts überdies einen Drahtverbindungsabschnitt (16, 17) umfaßt, mit dem ein Draht mit dem Aufnahmekontakt verbunden werden kann.

3. Verbinder nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß der Montageabschnitt (11) wenigstens ein sich seitlich erstreckendes Ende (13) besitzt, und daß der Drahtverbindungsabschnitt (16) wenigstens einen Drahtaufnahmeschlitz in dem sich seitlich erstreckenden Ende umfaßt.

4. Verbinder nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die Aufnahmekontakte (3) mit einer Schrittweise von weniger als 2,5 mm angeordnet sind.

Revendications

1. Connecteur électrique comprenant un bâti (1) portant plusieurs contacts femelles (3) destinés à s'accoupler avec un groupe correspondant de broches de contact mâles (100), dans lequel chaque contact femelle (3) comprend une partie femelle (5) définissant une ouverture (9) destinée à recevoir une broche de contact mâle (100) d'accouplement; une partie (11) de montage par laquelle le contact femelle est monté dans le bâti (1); et une partie intermédiaire (8) par laquelle la partie femelle (5) est reliée à la partie de montage (11) et qui permet un mouvement de la partie

femelle par rapport à la partie de montage à l'intérieur du bâti, la partie femelle (5) de chaque contact femelle comprenant deux bras élastiques opposés (6, 7) reliés par une partie de boucle (8), les extrémités libres des bras définissant ensemble une ouverture (9) de réception d'un contact mâle, la partie intermédiaire (18) comprenant un bras droit élastique unique s'étendant de la partie de montage (11) jusqu'à la partie de boucle (8), le contact femelle complet (3) étant découpé et formé à partir d'une pièce unique de métal en feuille, caractérisé en ce que le bras droit, élastique et unique (18) de chaque contact femelle s'étend à partir de la partie de montage (11), sensiblement parallèlement à la partie de boucle (8); et est relié à la partie de boucle (8) à la jonction entre une premier des bras (6) et la partie de boucle (8), le premier bras (6) étant le bras qui est plus éloigné que l'autre bras de la partie de montage (11), et la partie de montage (11) étant maintenue de façon immobile dans le bâti (1) d'une manière ajustée à force, la partie femelle (5) étant capable d'effectuer un mouvement limité par rapport à la partie de montage (11) grâce au bras droit élastique (18).

2. Connecteur selon la revendication 1, caractérisé en ce que la partie de montage (11) de chaque contact femelle comporte également une partie (16, 17) de connexion de fil au moyen de laquelle un fil peut être connecté au contact femelle.

3. Connecteur selon la revendication 1 ou la revendication 2, caractérisé en ce que la partie de montage (11) présente au moins une extrémité (13) s'étendant latéralement, la partie (16) de connexion de fil comprenant au moins une fente de réception de fil situé dans l'extrémité s'étendant latéralement.

4. Connecteur selon l'une quelconque des revendications précédentes, caractérisé en ce que les contacts femelles (3) sont disposés à un pas de moins de 2,5 mm.

