

Description

There is disclosed in the AMP Engineering and Purchasing Guide, 1979 Edition, at pages 7—42 to 7—47, an electrical connector assembly known as the CHAMP ACTION PIN connector. This electrical connector assembly comprises a connector housing having a mating face and a terminal receiving second face, one or more rows of terminal receiving grooves along the housing interior and extending from the second face toward the mating face, and a row of electrical terminals mounted in each row of grooves. The terminals are elongate along their paths of insertion coinciding with the grooves, and longitudinal post portions of the terminals project outwardly of the second face for wedge mounting the terminals within apertures of a printed circuit board.

The described connector assembly is assembled by first press fitting the longitudinal post portions of the terminals into the apertures of the printed circuit board. This is accomplished with a special applicator tool while the terminals in each row are still fixed to a carrier strip, which is subsequently removed. Once the terminals are installed and the carrier strips removed, the connector housing is pressed into place to complete the assembly.

It would be advantageous to have the terminals assembled to the housing before insertion in the board; however, precautions must be taken to prevent dislodging the terminals from the connector assemblies during shipment in commerce, and during wedge mounting of the terminals in apertures of a printed circuit board. The present invention resides in a cover for the mating face of each connector assembly, the cover serving to guide the terminals on assembly into the connector housing and to retain them in position both prior to and during mounting on a circuit board.

According to the invention, therefore, an electrical connector assembly as defined above is characterized in that a cover assembly is removably assembled on the housing and has a rib facing each row of terminals and extending into the housing interior to retain and guide the terminals in and along the grooves as the terminals are moved along their paths of insertion to enter the housing from the second face. The cover impinges the mating face and retains the terminals in the grooves as a force is exerted against the cover to move the terminals along their paths of insertion into the apertures of the printed circuit board.

EP—A—0042692, not published before the filing date of the present application, (Article 54(3) EPC) discloses a circuit board edge connector having elongate terminals which are inserted in a housing from the mating face. A tool received in the mating face engages the terminals to press longitudinal post portions projecting from the opposite face into apertures of a board. This connector is readily distinguished from the present invention insofar as the terminal receiving face and mating face are one and the same,

which obviates even the possibility of a cover being assembled to the mating face during insertion of the terminals.

US—A—4,080,041 discloses a right angle connector having a retainer plate removably mounted to a housing; however, the plate is not fixed to the mating face of the connector, and further is not in place during assembly of the terminals to the housing. US—A—3,553,632 discloses a connector having a retaining member which is permanently fixed to the terminal receiving face of a housing after the terminals are received therein.

A better understanding of the invention will be apparent by way of example from the following description in conjunction with the drawings in which:

Figure 1 is an exploded perspective view of a male or plug type electrical connector assembly having a cover, and being applied to a printed circuit board;

Figure 2 is a perspective view of a fully assembled electrical connector assembly of the type shown in Figure 1;

Figure 3 is a section view taken along line 3—3 of Figure 2;

Figure 4 is an exploded section view showing assembly tooling for assembling the electrical connector and cover shown in Figure 1;

Figure 4A is a fragmentary exploded perspective view with parts in section and parts broken away to show details of a portion of the connector assembly of Figure 1;

Figure 5 is a section view similar to Figure 3 and illustrating a female type connector and corresponding cover; and

Figure 6 is a cross-sectional view of the connectors of Figures 3 and 5 shown intermated.

Referring first to Figure 1, there is shown an exploded view of an electrical connector assembly, i.e. electrical connector, including a cover 1 having depending ribs 3 and a housing 5 having terminals 7 therein. The terminals 7 would be readily pushed out of the housing 5 without the cover 1 being positioned in the housing as described hereinbelow. The assembly of cover 1, housing 5 and terminals 7 is shown in Figure 2.

Referring now to Figure 3, there is shown a cross-sectional view of the connector assembly of Figure 2. The cover is positioned within the housing 5 with the depending ribs 3 positioned against the inner wall seat 13 of the housing and with the top portion 31 of the cover abutting the mating connector-receiving mating face 33 of the housing 5. The cover also impinges against the end surface 34 of a central, electrical plug portion 15 of the housing 5. The portion 15 includes grooves 17, the ends of which terminate in the horizontal portions 14, and into which the ends of terminals 7 abut. The terminals 7 are resilient spring members and are forced resiliently toward and against the plug portion 15 by the depending ribs 3 which simulate a mating connector and apply forces against the terminals 7 to retain the terminals within the housing 5.

Referring now to Figures 4 and 4A, there is shown an exploded view of the connector assembly. It can be seen that the rows of the terminals 7 have projecting post portions 24 at the ends, and are carried by a carrier strip 35. Two rows of the terminals with carrier strips have their post portions 24 inserted into apertures (not numbered) in a block form insertion tool 19. The carrier strips are then removed. The cover 1 is inserted into the housing 5, the cover being shown in phantom in Figure 4 after insertion into the housing 5. The cover thereby is applied to the mating face of the connector housing 5 and simulates the shape of a mating connector. The insertion tool with two rows of terminals 7 thereon, after carrier strips 35 have been removed, are then moved toward the housing 5 whereby the terminals 7 enter the housing through the openings 21 in the terminal receiving end 37 of the housing. It can be seen that each of the terminals 7 has a narrow portion 27 and a wide portion 25 with the junction of these portions being shown as shoulders 29. As the terminals 7 enter the housing, the top ends of the narrow portions 27 will move along paths of insertion coinciding with the grooves 17 as shown in Figure 3 and about the central plug portion 15. As can be seen from Figure 4A, the grooves 17 are recessed in the wall surfaces 61 or 63 on the central plug portion 16 and the grooves extend between the terminal receiving end 37, and the mating end 33. When the shoulders 29 impinge bottoms 22 of widened portions 20 of the openings 21, the terminals can no longer move toward the mating face 33 of the housing and are fully assembled in the housing.

As shown in Figure 3, the cover 1 has depending ribs 3 facing each row of terminals 7. The ribs 3 guide the terminals 7 during their insertion, so that the terminals are inserted in and along the grooves 17. Bowed surfaces 8 on the ribs 3 apply pressure against the outwardly bowed portions 6 of the terminals, forcing the terminals resiliently against the plug portion 15, so that the terminals are retained in place during shipment in commerce of the connector assembly.

The cover functions as a tool against which a force may be exerted to insert and wedge the terminals within apertures of a printed circuit board. The cover continues to hold the terminals in the housing as the terminals are inserted and wedged in the apertures. Further, the cover is forced to bear against the mating face of the housing when a force is applied to the cover. The housing 5, with terminals 7 and cover 1 therein, is mounted on a printed circuit board 9, by wedge mounting the post portions 24 of terminals 7 in apertures 11 which are aligned therewith, and by bolts 2 that secure the housing 5 to the printed circuit board 9, the bolts passing through apertures 23 in the housing and appropriate apertures 4 in the printed circuit board.

Referring now to Figure 5 there is shown a female version connector designed to mate with the connector of Figures 1 through 4. The mated connectors are shown in Figure 6. As can be

seen in Figure 5, the terminals 7 in housing 49 are the same as terminals 7 of Figures 1 through 4 except that they are shown rotated 180 degrees in respect of Figures 1 through 4. Rows of grooves 43 are the same as openings 21 for the grooves 17. The cover 41 is positioned in the housing 49 impinging the mating end 65 thereof. The cover has a depending rib 51 to simulate a connector. The terminals 7 have post portions 24 that project out of the housing 49 at the terminal receiving end 67.

The connector of Figure 5 is assembled in the same manner as described with respect to the connector of Figure 4 except that the strips of terminals 7 are rotated 180 degrees in the insertion tool 19 prior to insertion of the terminals into the housing 49. Upon insertion of the terminals 7 into the housing 49, the depending rib 51 of the cover 41 will be engaged by the terminals, and the cover will guide the terminals 7 in and along the grooves 43 and against the walls 45 as shown in Figure 5. It can be seen that the housing 49 has an inner wall portion 53 that is impinged by the rib 51. The connector can then be assembled onto a printed circuit board 9 (Figure 6) in the manner described with regard to the embodiment of Figures 1 through 4. The cover 41 can be removed to permit connection of the female connector housing 49 with a mating male connector housing 5 as shown in Figure 6.

Referring now to Figure 6, the terminals 7 of male connector housing 5 are mated with terminals 7 of the female connector housing 49. It can be seen that the mating connectors have taken the place of covers 1 and 41. The connectors of Figure 6 can each be applied to a different circuit board 9, 9 so that interconnection between circuit boards may take place by mating together the connectors as shown in Figure 6.

Claims

1. An electrical connector assembly comprises a connector housing (5, 49) having a mating face (33, 65) and a terminal receiving second face (37, 67), one or more rows of terminal receiving grooves (17, 43) along the housing interior and extending from the second face (37, 67) toward the mating face (33, 65), and a row of electrical terminals (7, 7) mounted in each row of grooves (17, 43), the terminals (7, 7) being elongate along their paths of insertion coinciding with the grooves (17, 43), and longitudinal post portions (24, 24) of the terminals (7, 7) projecting outwardly of the second face (37, 67) for wedge mounting the terminals (7, 7) within apertures (11, 11) of a printed circuit board (9, 9), characterized in that:

a cover (1, 41) is removably assembled on the housing (5, 49) and has a rib (3, 3, 51) facing each row of terminals (7, 7) and extending into the housing interior to retain and guide the terminals (7, 7) in and along the grooves (17, 43) as the terminals (7, 7) are moved along their paths of insertion to enter the housing (5, 49) from the

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The cover functions as a tool against which a force may be exerted to insert and wedge the terminals within apertures of a printed circuit board. The cover continues to hold the terminals in the housing as the terminals are inserted and wedged in the apertures. Further, the cover is forced to bear against the mating face of the housing when a force is applied to the cover. The housing 5, with terminals 7 and cover 1 therein, is mounted on a printed circuit board 9, by wedge mounting the post portions 24 of terminals 7 in apertures 11 which are aligned therewith, and by bolts 2 that secure the housing 5 to the printed circuit board 9, the bolts passing through apertures 23 in the housing and appropriate apertures 4 in the printed circuit board.

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second face (37, 67), the cover (1, 41) impinges the mating face (33, 65) and retains the terminals (7, 7) in the grooves (17, 43) as a force is exerted against the cover (1, 41) to move the terminals (7, 7) along their paths of insertion into the apertures (11, 11) of the printed circuit board (9, 9).

2. The electrical connector assembly according to Claim 1 in which the grooves (17, 43) have widened openings (21, 21) along the mating face (33, 65) and the terminals (7, 7) have shoulders (29, 29) impinging against bottoms (22, 22) of the widened openings (21, 21) to restrict movement of the terminals (7, 7) along the grooves (17, 43) towards the mating face (33, 65).

3. The electrical connector assembly as recited in Claims 1 or 2, in which the housing (5, 49) has an internal wall (13, 53) impinged by the rib (3, 3, 51) of the cover.

Patentansprüche

1. Elektrische Verbinderanordnung mit einem Verbindergehäuse (5, 49), das eine Verbindungsseite (33, 65) und eine Anschlußaufnahme-seite (37, 67) bildende zweite Seite aufweist, mit einer oder mehreren Reihen von Anschluß-aufnahmenuten (17, 43) entlang des Gehäuseinneren, die sich von der zweiten Seite (37, 67) in Richtung auf die Verbindungsseite (33, 65) erstrecken, und mit einer in jeder Reihe von Nuten (17, 43) angebrachten Reihe elektrischer Anschlüsse (7, 7), wobei die Anschlüsse (7, 7) in Längsrichtung ihrer mit den Nuten (17, 43) zusammenfallenden Einführbahnen länglich ausgebildet sind, und wobei längliche Stiftbereiche (24, 24) der Anschlüsse (7, 7) zur keilartigen Befestigung der Anschlüsse (7, 7) innerhalb von Öffnungen (11, 11) einer gedruckten Schaltungsplatte (9, 9) von der zweiten Seite (37, 67) herausragen, dadurch gekennzeichnet, daß eine Abdeckung (1, 41) lösbar an dem Gehäuse (5, 49) montiert ist und eine Rippe (3, 3, 51) aufweist, die jeder Reihe von Anschlüssen (7, 7) zugewendet ist und sich in das Gehäuseinnere hineinerstreckt, um die Anschlüsse (7, 7) in die Nuten (17, 43) und entlang der Nuten (17, 34) einzuführen sowie darin festzuhalten, wenn die Anschlüsse (7, 7) in Längsrichtung ihrer Einführbahnen derart bewegt werden, daß sie von der zweiten Seite (37, 67) her in das Gehäuse (5, 49) eintreten, und daß die Abdeckung (1, 41) an die Verbindungsseite (33, 65) anstößt und die Anschlüsse (7, 7) in den Nuten (17, 43) festhält, wenn auf die Abdeckung (1, 41) eine Kraft ausgeübt wird, um die Anschlüsse (7, 7) in Längsrichtung ihrer Einführbahnen in die Öffnungen (11, 11) der gedruckten Schaltungsplatte (9, 9) hineinzubewegen.

2. Elektrische Verbinderanordnung nach Anspruch 1, dadurch gekennzeichnet, das die Nuten (17, 43) verbreiterte Öffnungen (21, 21) längs der

Verbindungsseite (33, 65) aufweisen und daß die Anschlüsse (7, 7) Schultern (29, 29) besitzen, die gegen Bodenbereiche (22, 22) der verbreiterten Öffnungen (21, 21) stoßen, um eine Bewegung der Anschlüsse (7, 7) längs der Nuten (17, 43) in Richtung auf die Verbindungsseite (33, 65) zu begrenzen.

3. Elektrische Verbinderanordnung nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß das Gehäuse (5, 49) eine innenliegende Wand (13, 53) aufweist, an die die Rippe (3, 3, 51) der Abdeckung anstößt.

Revendications

1. Ensemble à connecteur électrique comprenant un boîtier (5, 49) de connecteur présentant une face d'accouplement (33, 65) et une seconde face (37, 67) de réception de borne, une ou plusieurs rangées de gorges (17, 43) de réception de borne s'étendant le long de l'intérieur du boîtier de la seconde face (37, 67) vers la face d'accouplement (33, 65), et une rangée de bornes électriques (7, 7) montées dans chaque rangée de gorges (17, 43), les bornes (7, 7) étant allongées suivant leurs trajets d'insertion coïncidant avec les gorges (17, 43), et des tronçons de broches longitudinales (24, 24) des bornes (7, 7) faisant saillie vers l'extérieur de la seconde face (37, 67) pour un montage par action de coin des bornes (7, 7) dans des ouvertures (11, 11) d'une plaquette (9, 9) à circuit imprimé, caractérisé en ce que:

un couvercle (1, 41) est assemblé de façon amovible sur le boîtier (5, 49) et comporte une nervure (3, 3, 51) faisant face à chaque rangée de bornes (7, 7) et pénétrant à l'intérieur du boîtier pour retenir et guider les bornes (7, 7) dans et le long des gorges (17, 43) lorsque les bornes (7, 7) sont déplacées suivant leurs trajets d'insertion pour pénétrer dans le boîtier (5, 49) à partir de la seconde face (37, 67), le couvercle (1, 41) portant contre la face d'accouplement (33, 65) et retenant les bornes (7, 7) dans les gorges (17, 43) en même temps qu'une force est exercée contre le couvercle (1, 41) pour déplacer les bornes (7, 7) le long de leurs trajets d'insertion et les faire pénétrer dans les ouvertures (11, 11) de la plaquette (9, 9) à circuit imprimé.

2. Ensemble à connecteur électrique selon la revendication 1, dans lequel les gorges (17, 43) présentent des ouvertures élargies (21, 21) le long de la face d'accouplement (33, 65) et les bornes (7, 7) comportent des épaulements (29, 29) portant contre les fonds (22, 22) des ouvertures élargies (21, 21) afin de limiter le mouvement des bornes (7, 7) le long des gorges (17, 43) en direction de la face d'accouplement (33, 65).

3. Ensemble à connecteur électrique selon les revendications 1 ou 2, dans lequel le boîtier (5, 49) comporte une paroi intérieure (13, 53) contre laquelle porte la nervure (3, 3, 51) du couvercle.

