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Description

The present invention relates to a method and apparatus for polarizing a female pin conductor receiving connector.

Pin conductors have long been used as a means of providing a male terminal which is mateable with a female connector. Most commonly the pin conductors are arranged in a single row or double rows with the conductors staked into a printed circuit board, mounted on a wafer or mounted on a header.

The female connector generally includes a housing having an exterior end wall, a pair of opposing parallel exterior side walls extending from opposite edges of the end wall and a plurality of terminal receiving cavities formed between said side walls and the end wall. Each cavity has a pin receiving opening formed in the end wall. A plurality of terminals are mounted in some or all of the cavities. Each terminal has a portion that is mateable with a pin conductor when the pin conductor is received through the corresponding opening.

It is often desirable to polarize the female connector so that it will only fit on a certain array of pin conductors. This is normally done by blocking the pin receiving opening of the female connector so that said blocked opening corresponds with a missing pin conductor in a straight line array of conductors. In this manner, only the female connector having the blocked opening in the same position as the missing conductor will fit on that particular array of pin conductors.

In the past, the pin receiving opening would be blocked by one of two methods. The first method is to mould the opening shut when the housing is initially manufactured. The other method is to manufacture a small plug which is inserted into a pin receiving opening after manufacture of the connector housing. Both of these methods have proved to be extremely inefficient and relatively expensive. The first method is undesirable because it requires a mould tool change for each particular female connector housing. The second method overcomes the first method's drawbacks, however, at the cost of producing an additional part.

It is, therefore, the principal object of the present invention to provide a new and improved method and apparatus for polarizing a female pin conductor receiving connector.

The female connector includes a housing having an exterior end wall, a pair of opposing parallel exterior side walls extending from opposite edges of the end wall, and a plurality of terminal receiving cavities formed between said side walls and the end wall, each cavity having a pin receiving opening formed in the end wall. A plurality of terminals are mounted in some or all of said cavities, each terminal having a portion that is mateable with a pin conductor when it is received through the corresponding opening.

The polarizing method comprised the steps of deforming a portion of the housing adjacent a pin

receiving opening to define a deformed section whereby the end wall opening is substantially closed by the deformed section to prevent a pin conductor from being received therethrough.

5 The apparatus for performing said method comprises means for holding said connector in a given disposition and punch means having an end engageable with a portion of the housing adjacent a pin receiving opening for deforming and moving said portion whereby the pin receiving opening is substantially closed to prevent a pin conductor from being received therethrough.

10 Some ways of carrying out the invention embodying both its method and apparatus aspects is described in detail below by way of example, and not by way of limitation and with reference to drawings in which:

15 FIG. 1 is a perspective view of a female pin conductor receiving connector modified in accordance with a method and apparatus of the present invention, and two wafers;

20 FIG. 2 is a side sectional view of a terminal receiving cavity of the female connector shown in Fig. 1;

25 FIGS. 3, 4 and 5 are sequential sectional views of a female pin conductor receiving connector mounted in the apparatus of the present invention and defining the method of the present invention; and

30 FIG. 6 shows a modification.

35 Turning now to the drawings, Fig. 1 shows a female pin conductor receiving connector, generally designated 10. Connector 10 is adapted to electrically connect a plurality of wires 12 with one of a plurality of wafers, generally designated 14a and 14b.

40 Each wafer comprises an insulative base 16 which is mountable on a printed circuit board 18 and has a group of pin conductors 20a and 20b mounted in and extending from the base 16 in a straight line.

45 It is to be noted that pin connectors other than wafers can be used in association with connector 10.

50 The female connector 10 has a housing 21 which includes an exterior end wall 22 and two parallel spaced apart exterior side walls 24 and 26 extending from the edges of the end wall 22. A plurality of barrier walls 28 extend between the side walls 24 and 26 to define with the end wall 22 a plurality of terminal receiving cavities 30. Each cavity 30 has a pin receiving opening 32 formed in the end wall 22 as a means of allowing a pin conductor 20 to be received within a particular cavity 30.

55 Each of the cavities is capable of mounting a terminal, generally designated 36 (Fig. 2), therein. Each terminal has a wire connecting portion 38 at one end and a pin mateable portion 40 formed at the other end. Looking at Fig. 2, the wire connecting portion 38 is seen to be an insulation displacement section that is well known in the art and the pin mateable portion 40 is seen to be a loop-shaped, double cantilevered configuration also well known in the art. It is understood that

there are other wire connecting portions 38 and pin mateable portions 40 known in the art that would serve the same purposes as set forth herein.

Looking at Fig. 1, both wafers 14a and 14b have three pin conductors 20a and 20b respectively. Also, each wafer 14a and 14b has a blank position 42a and 42b, respectively, wherein a pin conductor could have been mounted but was not. Positions 42a and 42b are purposely left blank as a means of polarizing or keying a particular female connector 10 with a particular wafer 14a and 14b.

In order to ensure that the correct female connector 10 is mounted on the correct wafer 14a or 14b, the pin receiving opening 32 corresponding with the blank position 42 is closed to prevent a pin conductor 20 from being received therethrough. In the past, this has been accomplished by either moulding the opening shut or inserting a small plug by hand within the opening. These two methods are expensive and inefficient.

In the present example, a portion of the housing 21 adjacent a desired opening 32 is modified to produce a deformed section 44. The deformed section 44 is a portion of side wall 24 which is pushed toward the opposite side wall 26 so that it at least partially blocks terminal receiving cavity 30. In this configuration, a pin conductor 20 cannot be received through opening 32. Thus, looking at Fig. 1, female connector 10 will only be mateable with wafer 14a and not wafer 14b.

In order to produce a deformed section 44 as described above, the connector 10 is held in a suitable connector nest 46 as shown in Fig. 3. The nest 46 can be of a type that is disclosed in European Patent Application Serial No. 83305544.5 publication No. 0104874. However, any connector holding means which presents side wall 24 outwardly is acceptable.

After connector 10 is held in nest 46, a punch 48 is provided having an end 50 which is engageable with the housing 21 to produce the deformed section 44. The end 50 of punch 48 has a slanted surface formed thereat having a leading edge in the plane of the inside of end wall 22.

In Fig. 4, the punch 48 has been actuated by suitable means so that the end 50 engages side wall 24 slanting a portion thereof inwardly toward side wall 26 producing deformed section 44. In fig. 5, punch 48 has been retracted leaving the side wall permanently deformed and blocking the adjacent opening 32.

The punch 48 operates with a cutting action to sever the deformed section 44 from the side wall 24 along the lower edge of the section 44 and at least partially up its vertical sides so that the section 44 is permanently curled or rolled over into the cavity 30. The housing 21 material is chosen from suitable plastically deformable materials having no substantial shape-memory so as to permit the section 44 to be severed and permanently displaced into the cavity 30 in the manner described. Suitable materials are polyester or filled or unfilled nylon.

Instead of forming the section 44, the punch 48' may alternatively be provided with a rounded nose 50' (see Fig. 6) to form a permanently, inwardly extending depression or "bubble" 44' in the side wall 24 to block the adjacent opening 32.

Claims

10. A method of polarizing a female pin conductor receiving connector, said connector including a housing (21) having an exterior end wall (22), a pair of opposing parallel exterior side walls (24, 26) extending from opposite edges of the end wall, and a plurality of terminal receiving cavities (30) formed between said side walls and the end wall, each cavity having a pin receiving opening (32) formed in the end wall, and a plurality of terminals (36) mounted in some or all of said cavities, each terminal having a portion (40) that is mateable with a pin conductor when it is received through the corresponding opening (32), said polarizing method characterised by the steps of deforming a portion of the housing (21) adjacent a pin receiving opening (32) to define a deformed section (44, or 44') whereby the end wall opening (32) is substantially closed by the deformed section to prevent a pin conductor (20a, 20b) from being received therethrough.
15. The method of claim 1 wherein the deforming step includes moving one of the side walls (26) of a cavity generally at its juncture with the end wall (22) toward the other side wall (24) thereby defining said deformed section (44 or 44').
20. The method of claim 2 wherein said moving step includes transversely punching the side wall (26).
25. The apparatus for polarizing a female pin conductor receiving connector by a method as claimed in claim 1, 2 or 3 comprising means (46) for holding said connector in a given disposition with one of its side walls (26) presented outwardly, and punch means (48 or 48') having an end (50 or 50') engageable with a section of one of the side walls (26) generally at its juncture with the end wall (22) for deforming and permanently moving said section (44 or 44') toward the other side wall (24) whereby the end wall opening (32) is substantially closed by the deformed section (44 or 44') to prevent a pin conductor from being received therethrough.
30. The apparatus of claim 4 wherein said punch means (48) is movable between a first position away from said connector to a second position so that said end (50 or 50') engages and then travels past said side wall (26) in order to form said section (44 or 44').
35. The apparatus of claim 5 wherein said connector is held in said holding means so that the engaged side wall (26) is transverse to the movement of the punch means (48 or 48').
40. The apparatus of claim 6 wherein the end (50) of the punch means (48) has a slanted surface with respect to the engaged side wall (26).
45. The apparatus of claim 7 wherein the end (50) of the punch means (48) has a slanted surface with respect to the engaged side wall (26).
50. The apparatus of claim 8 wherein the punch means (48) has a rounded nose (50') for forming a permanent inwardly extending depression (44') in the side wall (24) to block the adjacent opening (32).
55. The apparatus of claim 9 wherein the punch means (48) has a rounded nose (50') for forming a permanent inwardly extending depression (44') in the side wall (24) to block the adjacent opening (32).
60. The apparatus of claim 10 wherein the punch means (48) has a rounded nose (50') for forming a permanent inwardly extending depression (44') in the side wall (24) to block the adjacent opening (32).
65. The apparatus of claim 11 wherein the punch means (48) has a rounded nose (50') for forming a permanent inwardly extending depression (44') in the side wall (24) to block the adjacent opening (32).

Patentansprüche

1. Verfahren zum Codieren eines einen Buchsenleitungsstecker aufnehmenden Steckverbinder, der ein eine äußere Endwand (22) sowie ein Paar von gegenüberliegenden, parallelen, sich von gegenüberliegenden Ecken der Endwand erstreckenden Außenseitenwänden (24, 26) umfassendes Gehäuse (21) und eine Anzahl von zwischen den Seitenwänden und der Endwand ausgebildeten Anschlußempfangshohlräume (30) aufweist, wobei jeder in der Endwand ausgebildete Hohlräum eine Steckerempfangsoffnung (32) hat, und der eine Anzahl von in einigen oder allen Hohlräumen montierten Anschläßen (36) aufweist, von denen jeder einen mit einem von der korrespondierenden Öffnung (32) aufgenommenen Leitungsstecker verbindbaren Bereich (40) aufweist, gekennzeichnet durch die Schritte des Deformierens eines an eine einen Stecker aufnehmende Öffnung (32) angrenzenden Teils des Gehäuses (21) zwecks Definition eines deformierten Bereiches (44 oder 44'), wonach die Endwandöffnung (32) durch den deformierten Bereich im wesentlichen geschlossen ist, um dadurch ein Aufnehmen eines Leitungssteckers zu verhindern.

2. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß der Deformierungsschritt eine Bewegung einer der Seitenwände (26) eines Hohlräumes im wesentlichen an ihrer Verbindungsstelle zur Endwand (22) in Richtung der anderen Seitenwand (24) umfaßt, wobei der deformierte Bereich (44 oder 44') definiert wird.

3. Verfahren nach Anspruch 2, dadurch gekennzeichnet, daß der Bewegungsschritt ein transversales Prägen der Seitenwand (26) umfaßt.

4. Gerät zum Codieren eines einen Buchsenleitungsstecker aufnehmenden Steckverbinder nach einem Verfahren nach den Ansprüchen 1, 2 oder 3 mit Mitteln (46) zum Halten des Steckverbinder in einer gegebenen Disposition, in der eine der Seitenwände (26) auswärts gelegen ist, und mit Prägemitteln (48 oder 48'), die ein an einen Bereich einer Seitenwand (26) im wesentlichen an der Verbindungsstelle zur Endwand (22) anlegbares Ende zum Deformieren und permanenten Bewegen dieses Bereiches (44 oder 44') in Richtung der anderen Seitenwand (24) haben, wobei die Endwandöffnung (32) im wesentlichen durch den deformierten Bereich (44) zwecks Verhinderung einer Aufnahme eines Leitungssteckers geschlossen ist.

5. Gerät nach Anspruch 4, dadurch gekennzeichnet, daß die Prägemittel (48) zwischen einer vom Steckverbinder entfernten ersten Position in eine zweite Position bewegbar sind, so daß das Ende (50 oder 50') anliegt und sich dann zur Seitenwand (26) bewegt, um den Bereich (44 oder 44') zu formen.

6. Gerät nach Anspruch 5, dadurch gekennzeichnet, daß der Steckverbinder in den Haltemitteln so gehalten ist, daß die angelegte Seitenwand (26) quer zur Bewegung der Prägemittel (48 oder 48') ausgerichtet ist.

7. Gerät nach Anspruch 4, dadurch gekenn-

zeichnet, daß das Ende (50) der Prägemittel (48) mit Rücksicht auf die angelegte Seitenwand (26) eine schräge Oberfläche hat.

Revendications

1. Procédé pour "polariser" ou individualiser un connecteur femelle recevant un conducteur en forme de broche, ce connecteur comportant un boîtier (21) ayant une paroi frontale externe (22), une paire de parois latérales externes opposées et parallèles (24, 26) s'étendant à partir de côtés opposés de la paroi frontale, et une pluralité de cavités (30) réceptrices de broches formées entre les parois latérales et la paroi frontale, chaque cavité comprenant une ouverture (32) de réception d'une broche formée dans la paroi frontale, et une pluralité de bornes (36) montées dans certaines des cavités ou dans la totalité de celles-ci, chaque borne comprenant une partie (40) qui coopère avec un conducteur en forme de broche lorsque ce conducteur en forme de broche est engagé à travers l'ouverture correspondante, caractérisé en ce qu'il comprend les étapes consistant à déformer une portion du boîtier (21) adjacente à une ouverture (32) de réception d'une broche, afin de définir une section déformée (44 ou 44') de telle façon que l'ouverture (32) dans la paroi frontale soit pratiquement fermée par la section déformée, afin d'empêcher qu'un conducteur en forme de broche (20a, 20b) ne soit reçu à travers cette ouverture.

2. Procédé suivant la revendication 1 caractérisé en ce que l'étape de déformation consiste à déplacer l'une des parois latérales, généralement à sa jonction avec la paroi frontale (22), en direction de l'autre paroi latérale 24, de manière à définir ainsi la section déformée (44, ou 44').

3. Procédé suivant la revendication 2 caractérisé en ce que l'étape de déplacement consiste à poinçonner transversalement la paroi latérale (26).

4. Appareil pour "polariser" ou individualiser un connecteur femelle recevant un conducteur en forme de broche par un procédé suivant l'une quelconque des revendications 1, 2 et 3, caractérisé en ce qu'il comprend des moyens (46) pour maintenir le connecteur dans une position donnée avec l'une de ses parois latérales (26) présentée vers l'extérieur, et un poinçon (48 ou 48') ayant une extrémité (50 ou 50') pouvant venir en contact avec une section de l'une des parois latérales (26), généralement à sa jonction avec la paroi frontale (22), afin de déformer et de déplacer d'une manière permanente cette section (44 ou 44') en direction de l'autre paroi latérale (24) si bien l'ouverture (32) dans la paroi frontale est pratiquement fermée par la section déformée (44 ou 44') pour empêcher qu'un conducteur en forme de broche ne soit engagé à travers cette ouverture.

5. Appareil suivant la revendication 4 caractérisé en ce que le poinçon (48) est mobile entre une première position éloignée du connecteur et une seconde position dans laquelle son extrémité (50

ou 50') vient en contact avec la paroi latérale 26 et passe ensuite à travers elle afin de former la section (44 ou 44').

6. Appareil suivant la revendication 5 caractérisé en ce que le connecteur est immobilisé dans les moyens de maintien de telle façon que la paroi latérale (26) qui est engagée, s'étende transversa-

lement par rapport au mouvement du poinçon (48 ou 48').

7. Appareil suivant la revendication 4 caractérisé en ce que l'extrémité (50) du poinçon (48) présente une surface inclinée par rapport à la paroi latérale engagée (26).

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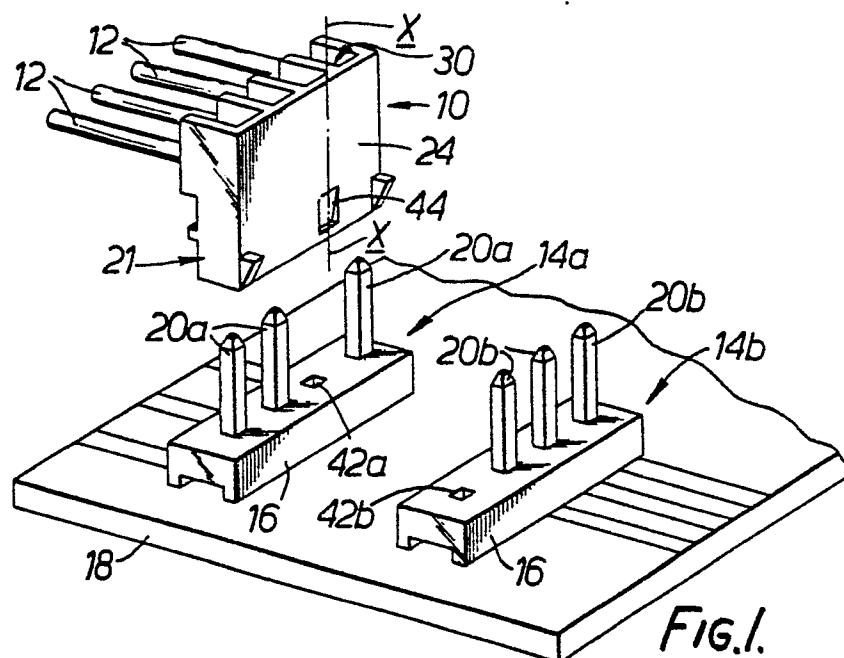


FIG. 1.

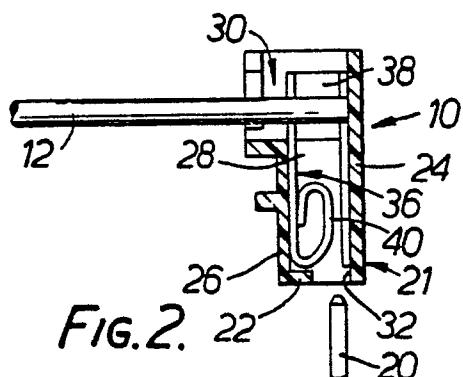


FIG. 2.

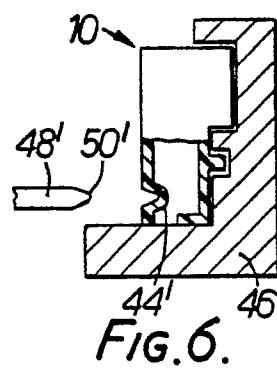


FIG. 6.

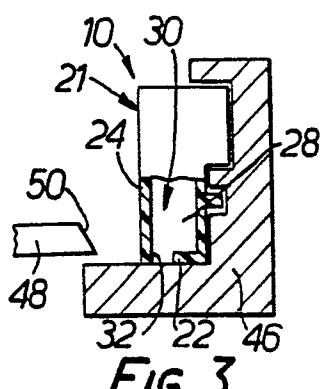


FIG. 3.

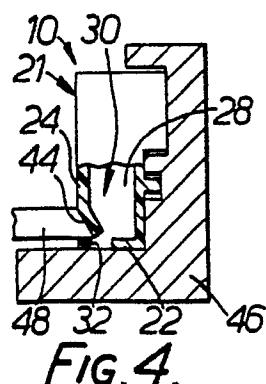


FIG. 4.

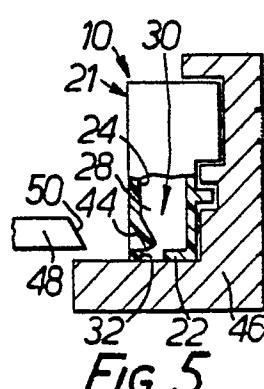


FIG. 5.