



Description

We have described in US—A—3 397 381 and DE—A1—1 590 006 a circuit board edge connector comprising an insulating housing defining an elongate cavity for receiving a daughter circuit board, the cavity having a base, a pair of parallel rows of passages extending through the base and communicating with the cavity on opposite sides thereof, and a plurality of electrical terminals each mounted in a respective passage and each having a mating portion in the cavity, a laterally offset portion adjacent the inner face of the base, and a connecting tail located beyond the outer face of the base and being laterally offset, by virtue of the offset portion, from the mating portion.

We have also described in US—A—4 186 982, an electrical terminal provided with an enlarged laterally resilient mounting portion adapted to be force fitted into an internally metallically plated hole in a circuit board to make permanent electrical contact with the internal plating of the hole. Such mounting portions are usually provided only on rectilinear pin or post terminals, in view of the high insertion force required to drive the mounting portions into the holes.

US—A—4 089 581 discloses a circuit board edge connector comprising an insulating housing defining an elongate cavity for receiving a daughter circuit board, the cavity having a base, a pair of parallel rows of passages extending through the base and communicating with the cavity on opposite sides thereof, and a plurality of terminals each mounted in a respective passage and each having a mating portion in the cavity, a laterally offset portion adjacent to an inner face of the base, and a connecting tail located beyond the outer face of the base, the connector being arranged in combination with a tool and a mother circuit board having a row of internally plated holes, each mating portion being spaced from that wall of the cavity which is adjacent the mating portion to permit insertion of a respective tool member between the wall and the mating portion to engage the offset portion of the terminal, each terminal being provided between its connecting tail and the outer face of the base with an enlarged laterally resilient mounting portion adapted to be force fitted into a respective hole in the mother board by driving the tool against the offset portion, the number and arrangement of the holes corresponding to the number and arrangement of the connecting tails, whereby the connector is mounted on the board by inserting each tail through a respective hole, inserting the tool in the cavity to engage the offset portions and applying an axial force to the tool to drive the mounting portions into the holes of the board. The resilient mounting sections of the terminals are adapted for facile insertion into and removed from the holes in the mother board without mechanical deformation of the holes.

The general state of the art is further exemplified by US—A—3 348 191, US—A—3 601 782 and US—A—3 725 842.

The present invention is concerned with connectors having mounting sections adapted to make permanent or semi-permanent connections by effecting deformation of the holes and the hole plating on insertion and by means of resilient deformation exhibiting substantial stored energy to maintain good connection in a working environment. Such mounting sections as disclosed in US—A—4 186 982 require substantial insertion forces, and it is an object to provide such a connector in which the relevant high forces can be applied whilst minimising risk of damage to the connector, the terminals and the board.

According to the invention a circuit board edge connector comprising an insulating housing defining an elongate cavity for receiving a daughter circuit board, the cavity having a base, a pair of parallel rows of passages extending through the base and communicating with the cavity on opposite sides thereof, and a plurality of terminals each mounted in a respective passage and each having a mating portion in the cavity, a laterally offset portion adjacent an inner face of the base, and a connecting tail located beyond the outer face of the base, the connector being arranged in combination with a tool and a mother circuit board having a row of internally plated holes, each mating portion being spaced from that wall of the cavity which is adjacent the mating portion to permit insertion of a respective tool member between the wall and the mating portion to engage the offset portion of the terminal, each terminal being provided between its connecting tail and the outer face of the base with an enlarged laterally resilient mounting portion adapted to be force fitted into a respective hole in the mother board by driving the tool against the offset portion, the number and arrangement of the holes corresponding to the number and arrangement of the connecting tails, whereby the connector is mounted on the board by inserting each tail through a respective hole, inserting the tool in the cavity to engage the offset portions and applying an axial force to the tool to drive the mounting portions into the holes of the board, is characterised in that each mounting portion comprises a pair of legs joined at their ends and having surfaces which face one another in a shear plane between the legs and with respect to which the legs are mutually laterally offset, the legs being such as to be resiliently compressed towards one another in mutually contiguous frictional relationship as the mounting portion is forced into the hole in the mother circuit board, the housing is of rigid insulating material, the connecting tail being laterally offset from the mating portion by virtue of the offset portion which engages an inner face of the base between the tail and the contact portion, a tool base is disposable below the mother board

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and has openings for receiving the connecting tails whereby the connector can be mounted on the mother board by disposing the mother board on the tool base with each hole in alignment with an opening in the tool base, inserting the connecting tails through respective holes to extend into the openings, and engaging the tool members with the offset portions substantially in alignment with the tails and applying force which is transmitted substantially axially of the tails to drive the mounting portions into the holes.

For a better understanding of the invention an embodiment thereof will now be described by way of example with reference to the accompanying drawings in which:—

Figure 1 is a perspective view, shown partly in section, of a first circuit board edge connector, exploded from a mother circuit board, and showing a second such connector mounted on the mother board;

Figure 2 is a cross-sectional view of a connector of Figure 1 in association with tooling positioned to mount the connector on the mother circuit board; and

Figure 3 is a similar view to that of Figure 2 but showing the connector after having been mounted on the mother circuit board.

A circuit board edge connector 10 comprises a rigid insulating housing 12 of plastics material, having a slot 14 opening into a mating face 16 of the housing along substantially its full length, for receiving a daughter circuit board (not shown). Two parallel rows of aligned terminal receiving recesses 18 each having a side wall 19 (Figure 2) open into the slot 14 from respective sides thereof. The housing 12 has a base 26 (Figures 2 and 3) through which extend passages 22 each communicating with one of the recesses 18. Mounting flanges 28 are provided at the ends of the housing 12.

Each of electrical terminals 32 in the housing 12 comprises a mating portion in the form of a cantilever contact blade 34 for engaging the daughter circuit board, an intermediate offset portion 36 providing a shoulder, an enlarged resilient mounting portion 38 connected to the portion 36 by a rectilinear shank 37 extending substantially parallel to the mating portion 34 and a connecting tail 40 extending from the portion 38. Each terminal 32 is mounted in one of the recesses 18, with its shank 37 extending through the corresponding passage 22, the mounting portion 38 of the terminal lying beyond the outer face 41 of the base 26 of the housing 12 and the portion 36 engaging the inner face 39 of the base 26.

In order to mount the connector 10 on a mother circuit board 44 having internally metallically plated holes 42 therein, corresponding in spacing and arrangement to the connecting tails 40, the board 44 is positioned on a tool base 46, having spaced longitudinal grooves 48 therein, so that each hole 42 is aligned with one of these grooves. The con-

necter 10 is then aligned with the base 46 and is moved theretowards to insert each tail 40 of each terminal 32 through a respective hole 42 into the groove 48 aligned therewith, the portion 38 of the terminal resting on the plating of the hole 42, as shown in Figure 2.

A terminal driving tool 52 has legs 54, each leg 54 terminating in a shoulder 58 shaped snugly to engage the portion 36 of the corresponding terminal 32. Each mating portion 34 is spaced from the adjacent wall 19 to permit the insertion of one of the legs 54 between the portion 34 and the adjacent wall 19.

The legs 54 of the tool 52 having been inserted into the recesses 18 so that each shoulder 58 thereof engages the shoulder portion 36 of a respective terminal 32, a downward axial force is applied to the tool 52 to drive the mounting portions 38 of the terminals into the holes 42 as shown in Figure 3, so as to be resiliently force fitted therein. The tool 52 is then withdrawn from the connector 10.

Each mounting portion 38, which may be formed according to the teaching of US—A—4,186,982, comprises a pair of legs 60 joined at their ends and having surfaces which face and abut one another in a shear plane between the legs and with respect to which the legs are mutually laterally offset. The legs 60 are compressed resiliently towards one another as the portion 38 is forced into the hole 42, in mutually contiguous frictional relationship.

Claims

1. A circuit board edge connector (10) comprising an insulating housing (12) defining an elongate cavity (14) for receiving a daughter circuit board, the cavity having a base (26), a pair of parallel rows of passages (22) extending through the base (26) and communicating with the cavity (14) on opposite sides thereof, and a plurality of terminals (32) each mounted in a respective passage (22) and each having a mating portion (34) in the cavity, a laterally offset portion (36) adjacent an inner face (39) of the base (26), and a connecting tail (40) located beyond the outer face (41) of the base (26), the connector (10) being arranged in combination with a tool and a mother circuit board (44) having a row of internally plated holes (42), each mating portion (34) being spaced from that wall of the cavity which is adjacent the mating portion (34) to permit insertion of a respective tool member (54) between the wall (19) and the mating portion (34) to engage the offset portion (36) of the terminal (32), each terminal (32) being provided between its connecting tail (40) and the outer face (41) of the base (26) with an enlarged laterally resilient mounting portion (38) adapted to be force fitted into a respective hole (42) in the mother board by driving the tool against the offset portion (36), the number and arrangement of the holes (42) corresponding to the number and arrangement

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and has openings for receiving the connecting tails whereby the connector can be mounted on the mother board by disposing the mother board on the tool base with each hole in alignment with an opening in the tool base, inserting the connecting tails through respective holes to extend into the openings, and engaging the tool members with the offset portions substantially in alignment with the tails and applying force which is transmitted substantially axially of the tails to drive the mounting portions into the holes.

For a better understanding of the invention an embodiment thereof will now be described by way of example with reference to the accompanying drawings in which:—

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A circuit board edge connector 10 comprises a rigid insulating housing 12 of plastics material, having a slot 14 opening into a mating face 16 of the housing along substantially its full length, for receiving a daughter circuit board (not shown). Two parallel rows of aligned terminal receiving recesses 18 each having a side wall 19 (Figure 2) open into the slot 14 from respective sides thereof. The housing 12 has a base 26 (Figures 2 and 3) through which extend passages 22 each communicating with one of the recesses 18. Mounting flanges 28 are provided at the ends of the housing 12.

Each of electrical terminals 32 in the housing 12 comprises a mating portion in the form of a cantilever contact blade 34 for engaging the daughter circuit board, an intermediate offset portion 36 providing a shoulder, an enlarged resilient mounting portion 38 connected to the portion 36 by a rectilinear shank 37 extending substantially parallel to the mating portion 34 and a connecting tail 40 extending from the portion 38. Each terminal 32 is mounted in one of the recesses 18, with its shank 37 extending through the corresponding passage 22, the mounting portion 38 of the terminal lying beyond the outer face 41 of the base 26 of the housing 12 and the portion 36 engaging the inner face 39 of the base 26.

In order to mount the connector 10 on a mother circuit board 44 having internally metallically plated holes 42 therein, corresponding in spacing and arrangement to the connecting tails 40, the board 44 is positioned on a tool base 46, having spaced longitudinal grooves 48 therein, so that each hole 42 is aligned with one of these grooves. The con-

necter 10 is then aligned with the base 46 and is moved theretowards to insert each tail 40 of each terminal 32 through a respective hole 42 into the groove 48 aligned therewith, the portion 38 of the terminal resting on the plating of the hole 42, as shown in Figure 2.

A terminal driving tool 52 has legs 54, each leg 54 terminating in a shoulder 58 shaped snugly to engage the portion 36 of the corresponding terminal 32. Each mating portion 34 is spaced from the adjacent wall 19 to permit the insertion of one of the legs 54 between the portion 34 and the adjacent wall 19.

The legs 54 of the tool 52 having been inserted into the recesses 18 so that each shoulder 58 thereof engages the shoulder portion 36 of a respective terminal 32, a downward axial force is applied to the tool 52 to drive the mounting portions 38 of the terminals into the holes 42 as shown in Figure 3, so as to be resiliently force fitted therein. The tool 52 is then withdrawn from the connector 10.

Each mounting portion 38, which may be formed according to the teaching of US—A—4,186,982, comprises a pair of legs 60 joined at their ends and having surfaces which face and abut one another in a shear plane between the legs and with respect to which the legs are mutually laterally offset. The legs 60 are compressed resiliently towards one another as the portion 38 is forced into the hole 42, in mutually contiguous frictional relationship.

Claims

1. A circuit board edge connector (10) comprising an insulating housing (12) defining an elongate cavity (14) for receiving a daughter circuit board, the cavity having a base (26), a pair of parallel rows of passages (22) extending through the base (26) and communicating with the cavity (14) on opposite sides thereof, and a plurality of terminals (32) each mounted in a respective passage (22) and each having a mating portion (34) in the cavity, a laterally offset portion (36) adjacent an inner face (39) of the base (26), and a connecting tail (40) located beyond the outer face (41) of the base (26), the connector (10) being arranged in combination with a tool and a mother circuit board (44) having a row of internally plated holes (42), each mating portion (34) being spaced from that wall of the cavity which is adjacent the mating portion (34) to permit insertion of a respective tool member (54) between the wall (19) and the mating portion (34) to engage the offset portion (36) of the terminal (32), each terminal (32) being provided between its connecting tail (40) and the outer face (41) of the base (26) with an enlarged laterally resilient mounting portion (38) adapted to be force fitted into a respective hole (42) in the mother board by driving the tool against the offset portion (36), the number and arrangement of the holes (42) corresponding to the number and arrangement



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of the connecting tails (40), whereby the connector (10) is mounted on the board (44) by inserting each tail (40) through a respective hole (42), inserting the tool in the cavity (14) to engage the offset portion (36) and applying an axial force to the tool to drive the mounting portions (38) into the holes (42) of the board (44), characterised in that each mounting portion (38) comprises a pair of legs (60) joined at their ends and having surfaces which face one another in a shear plane between the legs (60) and with respect to which the legs (60) are mutually laterally offset, the legs (60) being such as to be resiliently compressed towards one another in mutually contiguous frictional relationship as the mounting portion (38) is forced into the hole (42) in the mother circuit board (44), the housing (12) is of rigid insulating material, the connecting tail (40) being laterally offset from the mating portion (34) by virtue of the offset portion (36) which engages an inner face (39) of the base (26) between the tail and the contact portion, a tool base (46) is disposable below the mother board and has openings (48) for receiving the connecting tails (40) whereby the connector (10) can be mounted on the mother board (44) by disposing the mother board (44) on the tool base (46), inserting the connecting tails through respective holes (42) to extend into the openings (48), and engaging the tool member (54) with the offset portions substantially in alignment with the tails (40) and applying force which is transmitted substantially axially of the tails (40) to drive the mounting portions (38) into the holes (42).

2. A connector according to claim 1, characterised in that each tool member (54) terminates in a shoulder (58) shaped snugly to engage the offset portion (36) of the respective terminal (32).

3. A connector according to claim 1 or 2, characterised in that each mating portion (34) is in the form of a cantilever beam extending substantially normally of the base (26) of the cavity.

4. A connector according to claim 1 or 2, characterised in that the mating portion (34) of each terminal (32) extends substantially perpendicularly with respect to the offset portion (36) and is connected to one side thereof, the mounting portion (38) of the terminal (32) being connected to the offset portion (36) by a rectilinear shank portion (37) which is received in the respective passage (22) and is connected to the opposite side of the offset portion (36), the shank (37) and the connecting tail (40) of the terminal being in axial alignment with one another and being parallel to the mating portion (34) and extending perpendicularly with respect to the offset portion (36).

Revendications

1. Connecteur (10) pour bord de plaquette à circuit comprenant un boîtier isolant (12)

définissant une cavité allongée (14) destinée à recevoir une plaquette fille à circuit, la cavité ayant une base (26), deux rangées parallèles de canaux (22) s'étendant à travers la base (26) et communiquant avec la cavité (14) sur des côtés opposés de celle-ci, et plusieurs bornes (32) montées chacune dans un canal correspondant (22) et comportant chacune une partie (34) d'accouplement située dans la cavité, une partie (36) décalée latéralement adjacente à une face intérieure (39) de la base (26), et une queue (40) de connexion située au-delà de la face extérieure (41) de la base (26), le connecteur (10) étant agencé en combinaison avec un outil et une plaquette mère (44) à circuit présentant une rangée de trous (18) à revêtement interne, chaque partie (34) d'accouplement étant espacée de la paroi de la cavité qui est adjacente à la partie (34) d'accouplement pour permettre l'insertion d'un élément d'outil respectif (54) entre la paroi (19) et la partie (34) d'accouplement afin qu'il s'enclenche avec la partie décalée (36) de la borne (32), chaque borne (32) comportant, entre sa queue (40) de connexion et la face extérieure (41) de la base (26), une partie élastique (38) de montage élargie latéralement et destinée à être emboîtée à force dans un trou correspondant (42) de la plaquette mère par entraînement de l'outil contre la partie décalée (36), le nombre et l'agencement des trous (42) correspondant au nombre et à l'agencement des queues (40) de connexion, de manière que le connecteur (10) soit monté sur la plaquette (44) par insertion de chaque queue (40) dans un trou correspondant (42), insertion de l'outil dans la cavité (14) pour qu'il s'enclenche avec la partie décalée (36) et application d'une force axiale à l'outil pour entraîner les parties (38) de montage à l'intérieur des trous (42) de la plaquette (44), caractérisé en ce que chaque partie (38) de montage comprend deux branches (60) reliées à leurs extrémités et présentant des surfaces tournées l'une vers l'autre, dans un plan de cisaillement passant entre les branches (60) et par rapport auquel les branches (60) sont mutuellement décalées latéralement, les branches (60) étant conçues pour être comprimées élastiquement l'une vers l'autre dans une relation de frottement contigu mutuel lorsque la partie (38) de montage est introduite à force dans le trou (42) de la plaquette mère (44) à circuit, le boîtier (12) est en matière isolante rigide, la queue (40) de connexion étant décalée latéralement de la partie (34) d'accouplement du fait de la présence de la partie (36) de décalage qui porte contre une face intérieure (39) de la base (26), entre la queue et la partie de contact, une base (46) d'outil peut être disposée au-dessous de la plaquette mère et présente des ouvertures (48) destinées à recevoir les queues de connexion (40) afin que le connecteur (10) puisse être monté sur la plaquette mère (44) par disposition de la plaquette mère (44) sur la base (46) d'outil, insertion des queues de connexion dans



les trous correspondants (42) afin qu'elles pénètrent dans les ouvertures (48), et enclenchement de l'élément (54) d'outil avec les parties décalées, sensiblement en alignement avec les queues (40), et application d'une force qui est transmise sensiblement axialement aux queues (40) pour introduire les parties (38) de montage dans les trous (42).

2. Connecteur selon la revendication 1, caractérisé en ce que chaque élément d'outil (54) se termine par un épaulement (58) configuré pour s'enclencher étroitement avec la partie décalée (36) de la borne correspondante (32).

3. Connecteur selon la revendication 1 ou 2, caractérisé en ce que chaque partie (34) d'accouplement se présente sous la forme d'une poutre en porte-à-faux s'étendant à peu près perpendiculairement à la base (26) de la cavité.

4. Connecteur selon la revendication 1 ou 2, caractérisé en ce que la partie (34) d'accouplement de chaque borne (32) s'étend à peu près perpendiculairement à la partie décalée (36) et est reliée à un côté de celle-ci, la partie (38) de montage de la borne (32) étant reliée à la partie décalée (36) par un tige rectiligne (37) qui est logée dans le canal correspondant (22) et qui est reliée au côté opposé de la partie décalée (36), la tige (37) et la queue (40) de connexion de la borne étant en alignement axial l'une sur l'autre et étant parallèles à la partie (34) d'accouplement et s'étendant perpendiculairement à la partie décalée (36).

Patentansprüche

1. Schaltungsplattenrandverbinder (10) mit einem Isoliergehäuse (12), das einen länglichen Hohlraum (14) zur Aufnahme einer Tochter-Schaltungsplatte definiert, wobei der Hohlraum eine Basis (26), zwei parallele Reihen von sich durch die Basis (26) hindurcherstreckenden und mit dem Hohlraum (14) auf einander gegenüberliegenden Seiten desselben in Verbindung stehenden Durchführungen (22), sowie eine Mehrzahl von Anschlüssen (32) aufweist, deren jeder in einer entsprechenden Durchföhrung (22) montiert ist und deren jeder einen Verbindungsbereich (34) in dem Hohlraum, einen seitlich versetzten und an eine Innenfläche (39) der Basis (26) angrenzenden Bereich (36) sowie einen jenseits der Außenfläche (41) der Basis (26) liegenden Anschlußendbereich (40) aufweist, wobei der Verbinder (10) in Kombination mit einem Werkzeug und einer Mutter-Schaltungsplatte (44) angeordnet ist, die eine Reihe innen plattierter Löcher (18) aufweist, wobei jeder Verbindungsbereich (34) von derjenigen Wand des Hohlraums beabstandet ist, die dem Verbindungsbereich (34) benachbart ist, um das Einföhren eines entsprechenden Werkzeugelements (54) zwischen der Wand (19) und dem Verbindungsbereich (34) zum Angreifen an dem versetzten Bereich (36) des Anschlusses (32) zu

gestatten, und wobei jeder Anschluß (32) zwischen seinem Anschlußendbereich (40) und der Außenfläche (41) der Basis (26) mit einem vergrößerten, in seitlicher Richtung elastischen Befestigungsbereich (38) versehen ist, der durch Drängen des Werkzeugs gegen den versetzten Bereich (36) im Preßsitz in ein entsprechendes Loch (42) in der Mutter-Platte einpaßbar ist, wobei die Anzahl und Anordnung der Löcher (42) der Anzahl und Anordnung der Anschlußendbereiche (40) entspricht, wodurch der Verbinder (10) dadurch an der Platte (44) montiert wird, daß jeder Endbereich (40) durch ein entsprechendes Loch (42) hindurch eingesetzt wird, daß das Werkzeug derart in den Hohlraum (14) eingeföhrt wird, daß es an dem versetzten Bereich (36) angreift, und daß eine Axialkraft auf das Werkzeug ausgeübt wird, um die Befestigungsbereiche (38) in die Löcher (42) der Platte (44) hineinzutreiben; dadurch gekennzeichnet, daß jeder Befestigungsbereich (38) zwei Schenkel (60) aufweist, die an ihren Enden miteinander verbunden sind und Oberflächen aufweisen, die in einer Scherebene zwischen den Schenkeln (60) einander zugewendet sind, wobei die Schenkel (60) in bezug auf die Scherebene zueinander seitlich versetzt sind und wobei die Schenkel (60) derart ausgebildet sind, daß sie in federnd nachgiebiger Weise und sich gegenseitig unter Reibung berührend aufeinander zu zusammenpreßbar sind, wenn der Befestigungsbereich (38) in das Loch (42) in der Mutter-Schaltungsplatte (44) gezwängt wird, daß das Gehäuse (12) aus steifem, isolierenden Material besteht, daß der Anschlußendbereich (40) aufgrund des versetzten Bereichs (36), der zwischen dem Endbereich und dem Kontaktbereich an einer Innenfläche (39) der Basis (26) angreift, von dem Anschlußbereich (34) seitlich versetzt ist, und daß eine Werkzeugbasis (46) unter der Mutter-Platte angeordnet werden kann und Öffnungen (48) zur Aufnahme der Anschlußendbereiche (40) aufweist, wodurch der Verbinder (10) dadurch auf der Mutter-Platte (44) befestigbar ist, daß die Mutter-Platte (44) auf der Werkzeugbasis (46) angeordnet wird, daß die Anschlußendbereiche derart durch entsprechende Löcher (42) eingeföhrt werden, daß sie sich in die Nuten (48) hineinerstrecken, und daß das Werkzeugelement (54) im wesentlichen in Ausrichtung mit den Endbereichen (40) mit den versetzten Bereichen in Beröhrung gebracht wird und daß eine Kraft ausgeübt wird, die im wesentlichen axial zu den Endbereichen (40) übertragen wird, um die Befestigungsbereiche (38) in die Löcher (42) einzutreiben.

2. Verbinder nach Anspruch 1, dadurch gekennzeichnet, daß jedes Werkzeugelement (54) in einer Schulter (58) endet, die derart geformt ist, daß sie an dem versetzten Bereich (36) des jeweiligen Anschlusses (32) eng anliegend angreift.

3. Verbinder nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß jeder Verbindungsbereich (34) von derjenigen Wand des Hohlraums beabstandet ist, die dem Verbindungsbereich (34) benachbart ist, um das Einföhren eines entsprechenden Werkzeugelements (54) zwischen der Wand (19) und dem Verbindungsbereich (34) zum Angreifen an dem versetzten Bereich (36) des Anschlusses (32) zu



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bereich (34) in Form eines freitragenden Armes ausgebildet ist, der sich im wesentlichen senkrecht zur Basis (26) des Hohlraums erstreckt.

4. Verbinder nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß der Verbindungsbereich (34) jedes Anschlusses (32) sich in bezug auf den versetzten Bereich (36) im wesentlichen senkrecht erstreckt und mit einer Seite desselben verbunden ist, daß der Befestigungsbereich (38) des Anschlusses (32) mit dem versetzten Bereich (36) durch einen gerad-

linigen Schaftbereich (37) verbunden ist, der in der jeweiligen Durchführung (22) aufgenommen und mit der gegenüberliegenden Seite des versetzten Bereichs (36) verbunden ist, und daß der Schaft (37) und der Anschlußbereich (40) des Anschlusses miteinander axial ausgerichtet und parallel zu dem Verbindungsbereich (34) sind und sich in bezug auf den versetzten Bereich (36) senkrecht erstrecken.

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