



EUROPEAN PATENT SPECIFICATION

Date of publication of patent specification :
26.04.95 Bulletin 95/17

Int. Cl.⁶ : **H01R 13/645, H01R 13/44**

Application number : **91102277.0**

Date of filing : **18.02.91**

Receptacle connector having protected power contacts.

Priority : **20.02.90 US 481253**

Date of publication of application :
28.08.91 Bulletin 91/35

Publication of the grant of the patent :
26.04.95 Bulletin 95/17

Designated Contracting States :
DE FR GB IT NL

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EP 0 443 492 B1

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Description

This invention relates to the field of electrical connectors and more particularly to connectors having arrays of power contacts.

In today's electronic equipment, electrical interconnection is often provided by a plurality of rows of connectors mounted to a backplane or mother board interconnected to respective corresponding mating electrical connectors mounted to a plurality of daughter cards. Generally the connectors extend along the full length of the daughter card and include a highly dense array of contact members. In bringing such connectors into mating engagement it is necessary that the corresponding terminals engage and mate in associated pairs. Typically the daughter cards are mounted in card guides to aid in proper alignment of the connectors. For high density connectors having many small contact members, however, precise alignment requires more than just the card guide and frame members. The connectors, therefore, must also be provided with aligning means that complete the alignment prior to mating engagement of the terminal members. Furthermore, it is also desirable that keying means be provided to allow mating of connectors intended to be mated and disallowing mating of connectors not intended to mate.

In interconnecting the mother board or backplane to the daughter boards, it is often necessary to transmit both power as well as signal lines between the boards. Typically this has been accomplished by having one or more power connector units and one or more signal connector units positioned along the mating interface. In order to meet the demands of the industry to minimize the size of electronic equipment and provide for a maximum number of electrical interconnections, it is desirable to provide highly dense connectors that require a minimum amount of space on the respective boards.

It is further desirable to provide an array of modular connector units whereby the location of the power and signal lines can be readily located at the desired intervals position in each connector array by inserting the appropriate module.

Owing to the current being carried by the power portion of the interconnecting systems, certain safety requirements must also be met to prevent accidental touching of the power contacts by a human finger. In one commercially used safety test, a blunt ended probe having a diameter not less than about 6 mm (0.25 inches) is used to test the safety of the contact array. To pass the test, the probe must be prevented from engaging any power contacts of the array.

Furthermore, it is also desirable to include means for aligning the corresponding connectors prior to engagement of the complementary contact members therein, to prevent damage to the corresponding mating power or signal contact members.

It is further desirable to have means for keying the corresponding mother board and daughter board connectors to assure accurate interconnection of the desired power and signal lines.

While it is known to provide aligning and keying features for electrical connectors, typically these features are added at the ends of the mating connectors thereby requiring additional space in the array of ganged connector modules. US-A-4,726,791 discloses one such keying system for connectors comprising hexagonally shaped key members disposed in key-receiving passageways adjacent the ends of the contact arrays in the plug and receptacle sections of the connector. US-A-4,925,400 discloses another type of aligning and keying system for mounting connectors in a framework having both axial and angular centers. The connector is used to interconnect a mother board to a daughter board. Alignment pins and key members are located along the exterior edges of the connector housing and intermediate adjacent connectors in a row of connectors.

It is desirable to provide for keying or polarization of the plurality of ganged connectors while minimizing the space required on a board.

The present invention is directed to an electrical connector that alleviates the disadvantages and deficiencies of the prior art by providing guard means for preventing accidental touching of power contacts within the connector that concomitantly provides aligning means for corresponding connectors, while minimizing the space required on a backplane, circuit board or the like.

Accordingly, the present invention provides an electrical connector as defined in claims 1 and 2 and an electrical connector assembly as defined in claim 9.

An electrical receptacle for use in mating connectors mounted on circuit boards and the like, comprises a dielectric housing including a transverse body section and a shroud portion extending forwardly therefrom to a leading edge and further has an array of pin contact members extending forwardly of the body section and within a cavity defined by the shroud portion and at least one pair of elongate members extending forwardly beyond the leading edge of the shroud portion, the elongate members cooperating with the shroud portion to disallow inadvertent entry of a finger or the like to engage the contact members proximate the elongate members. The array of pin contact members extend forwardly of the body section and are within the shroud portion such that the leading ends of the pin contact members are recessed inwardly of the leading edge of the shroud portion. The pair of closely spaced elongate members are disposed within the shroud portion and within the pin contact array. The leading ends of the elongate members extend beyond the shroud portion and therefore the leading ends of the pin contact mem-

bers. The elongate members are judiciously placed so as to prevent entry and contact of the pin contact members by any portion of a normally sized human finger. The elongate members therefore minimize hazards resulting from accidental contact with the pin contacts that are adjacent to the elongate members.

For purposes of illustrating the invention the pair of elongate members are shown disposed within a four by six array of power contact members. It is to be understood that the invention may be used in other arrangements of contact member arrays. The number of elongate members used in other contact arrays will be determined by the number of power or other contact members that need to be protected. Additionally elongate members may be used, if desired, within the array of signal contact members. Since the elongate members extending beyond the shroud they will engage the mating face of the corresponding mating connector before the power and signal contacts members and therefore guide the mating connectors together.

In addition, at least one of the elongate members may include keying portions that will cooperate with a complementary keying aperture on the mating plug connector to assure the desired connectors are mated.

Further particular embodiments of the present invention are set out in the dependent claims.

It is an object of the invention to provide a means for aligning corresponding mating connectors without extending the external dimensions or size of the connector.

It is also an object of the invention to provide a connector having a minimum number of parts by providing parts that will serve multiple functions in the connector.

It is another object of the invention to provide guard means for preventing accidental engagement with the contact members of an array.

It is a further object of the invention to provide a modular power contact connector having safety and aligning features that permit use of the module at one or more locations along an extended connector array.

Some of the objects and advantages of the invention having been stated, others will appear as the description proceeds when taken in conjunction with the accompanying drawings.

FIGURE 1 is a three dimensional exploded view of an electrical connector assembly made in accordance with the invention, showing the receptacle connector mounted to a backplane and a mating plug connector on a daughter board exploded therefrom;

FIGURE 2 is an exploded sectioned perspective view of the pin header receptacle and the mating plug member of one of the power modules of the connector assembly of Figure 1 with portions of the housings broken away to illustrate the struc-

ture of the keying feature;

FIGURE 3 is an orthogonal sectioned view of the mating connector of Figure 2;

FIGURES 4 and 5 are end views of the receptacle member illustrating the guard means and safety features of the connector of Figure 2;

FIGURE 6 is a partially sectioned view of the receptacle member with portions of the housing broken away illustrating the guard means of the connector of Figure 2;

FIGURE 7 is a partially sectioned view of the receptacle module illustrating a means for attaching an elongate member to the housing and concomitantly securing the module to the backplane; FIGURE 8 illustrates an alternative embodiment of the connector of Figure 2; and

FIGURE 9 illustrates an alternative embodiment of a module having a different array of contact members.

Figure 1 is an exploded three dimensional of a modular connector assembly 10 made in accordance with the invention mounted to and electrically interconnecting circuits between a backplane 12 and a daughter card 16, the daughter card 16 being adapted to be received in a frame mounted to the backplane or mother board 12, shown representatively as card guide 14. As illustrated in this Figure, a pin header receptacle member 20 is mounted to backplane 12 and comprises a plurality of signal modules 21 and power modules 22. The mating plug connector member 70 is mounted to daughter card 16 and comprises a plurality of complementary signal modules 71 and power modules 72. Figure 1 also shows stiffener member 73 extending along the back of plug connector 70. The stiffener is preferably of the type disclosed in US-A-4,952,172.

Referring now to Figures 2 and 3, power module 22 comprises a housing 24 having a transverse body section or base 26 including an inner or mating face 28, an outer or board mounting face 30 and standoff portions 32 extending downwardly from board mount face 30. Body section 26 also includes a plurality of first apertures 34 extending from inner face 28 to outer face 30 and defining terminal receiving passageways and a plurality of second apertures 36 extending between inner and outer faces 28, 30 respectively and defining passageways for receiving elongate members 54, 64 therein as more fully described below. Housing 24 further includes side walls 38 extending upwardly from transverse body section 26 defining a shroud portion 39 having a leading edge 40. Shroud portion 39 and body section 26 define a cavity 42 therebetween. A plurality of terminal members 44 are disposed in the first apertures 34, the terminal members 44 including a first mating portion 46, intermediate portion 50, and a second mating portion or board receiving portion 52. As shown in Figures 2 and 3 the leading ends 48 of mating portions 46 are re-

cessed within the cavity 42 such that the leading edges 40 of the shroud 39 extend outwardly from the leading ends 48 of the terminal members 44. The intermediate portions 50 of the respective terminal members 44 are configured to be received within the terminal receiving passageways 34 of housing 24 and are shown representatively as being secured by an interference fit. The second mating or board engaging portion 52 of the terminal members 44 are shown representatively as pin members for being soldered or otherwise retained within the corresponding apertures (not shown) of the backplane 12. It is to be understood that other configurations of the second mating board mounting portion 52, such as compliant pin members may also be used to secure connector module 22 to the mother board, one such example is shown in Figure 7. It is further to be understood that the array of contact members may also include contact members having longer first mating portions such as members 45, shown in Figure 9.

Figures 2 and 3 also show a pair of elongate members comprised in the preferred embodiment of first or alignment member 54 and a second or keying member 64. In Figure 3, keying member 64 is shown in section in the foreground and alignment member 54 is shown in the background. First and second elongate members 54, 64 include first body portions 56, 66 respectively and second or mounting portions 58, 68 respectively. First body portion 56 of aligning member 54 is an essentially round or polygonal member having leading end 57. First body portion 66 of keying member 64 is essentially half of a polygonal member as known in the art. For purposes of illustration, member 64 is shown as a hexagon. The leading ends 57, 67 of aligning and keying members 54, 64 are configured to be received in complementary configured aligning and keying apertures 82, 88 respectively of the corresponding mating plug module 72. In the preferred embodiment, the leading end 57 of the first member or aligning member 54 extends above the leading end 67 of the keying member 64 so that the connector assembly 10 can be properly aligned before the keying member 64 is engaged. The alignment members are sufficiently long enough to effect axial alignment of the connectors prior to mating engagement of the contact terminals.

In accordance with the invention, the base portions 58, 68 of elongate members 54, 64 are identical, the structure, therefore, will be discussed with reference to base portion 68 of keying member 64. As shown in Figures 2 and 3, the base portion 68 is shaped as a regular polygonal portion, which is dimensioned to be received and held in a complementary polygonal portion of a respective aperture 36 in housing 24. As best seen in Figure 2, a screw 69 is inserted from the underside 30 of the pin header module 22 to secure the elongate member 64 in position. For purposes of illustration the base portion 68 is shaped as

a hexagon. Other configurations may also be used. A regular polygon is preferred to prevent rotation of the alignment or keying member or both. In accordance with the invention second apertures 36 of base or transverse portion 26 are identical such that elongate members 54, 64 may be secured in either aperture 36. To maximize the possibilities for aligning and keying, the elongate members may include two post members represented as 54 or two keying members 64 or a combination thereof. The interchangeability and resulting permutations and combinations of elongate members 54, 64 allow the pin header module 22, and therefore, assembly 20 to be customized at the time of assembling the connector array in an apparatus, thereby minimizing the problem of having duplicate keying arrangements for connectors 20 in the same connector on a mother board or backplane.

Figures 2 and 3 further show the plug power module 72 comprising a housing 74 having mating face 76, rear face 78 and a plurality of first and second apertures 80, 82 therethrough. Apertures 80 define and receive socket members 84 therein. Apertures 82 are configured to receive corresponding first and second body portions 56, 66; 58, 68 of elongate members 54, 64 respectively of corresponding receptacle power module 22 upon mating therewith. In Figure 2, the passageways 82 of plug modules 72 are identically configured such that a keying nut 86 can be received within the passageway 82 in a selected position to receive keying post 64. Keying nut 86 includes aperture 88 extending therethrough and configured to receive first body portion 66 of keying post 64. Passageways 82 have a forward polygonal shaped portion and a smaller rearward cylindrical portion with ledge 83 being formed at the transition location between the two portions. As best seen in Figure 3, the keying nut 86 is securable, preferably by press fit, against ledge 83 within passageway 82. Keying nut 86 can be removed from passageway 82 by inserting a tool from rear face 78 of housing 74 into aperture 82. Again this versatility for location alignment and keying members 54, 64 provides a means whereby the connector assembly can be customized at the time an apparatus is being made.

Figures 4 and 5 are taken from the same direction as Figure 3 and illustrate the safety features of the present invention wherein by the judicious placing of the elongate members 54, 64, neither a finger (Figure 4) nor a probe having a minimum diameter of about 6 mm (0.25 inches) (Figure 5) can be inserted between an elongate member 64 and a side wall 38 of receptacle module 22 to engage the recessed pin contact members 44 adjacent members 54 and 64. Figure 6 is taken looking along a side wall of module 22 and illustrates that the probe cannot be inserted between the pair of elongate members 54, 64 to engage adjacent pin members 44.

Figure 7 shows a further feature of the invention

wherein at least one of the elongated members, shown here as aligning member or post 54, can be used to provide means for securing the connector to board 12. In this arrangement, board 12 includes an aperture 11 for receiving mounting means 169 from the under surface of panel or board 12. It is to be understood that the elongated member may also be provided with other mounting means such as jackscrews.

Figure 8 shows an alternative embodiment 122 of the invention whereby the elongate members 54, 64 are placed in a different location within the shroud 139 of module 122. In accordance with the invention, elongate members are placed within the pin array of modules having power contact members only. It is to be recognized that the elongate members will protect inadvertent access only to those pin contact members that are essentially adjacent to the elongate members. For purposes of illustrating the invention this pin array is shown as a six by four matrix arrangement of members. The number of elongate members necessary to provide sufficient guard means for power contact members can be determined from the geometric configuration of the contact members in the power module or connector. The dimensions of the elongate members are such that each one essentially replaces four contact members.

Figure 9 shows a further alternative embodiment 222 of a connector module. In this embodiment, one row of contact members 45 is shown as extending to the leading edge 40 of the side wall 38 and comprise grounding means for the connector.

The present invention gives the advantage of having a pair of members that concomitantly provide aligning and safety features and that also permit keying of the mating connectors. In addition, the members may also provide the means for mounting the connector to a board or backplane. These features are provided by members disposed within the pin array therefore eliminating the need for additional space on a board for providing the capabilities. The invention further provides flexibility for arranging various modules within a connector assembly.

It is thought that the connector assembly of the present invention and many of its attendant advantages will be understood from the foregoing description. Changes may be made in the form, construction and arrangement of parts thereof without departing from the spirit and scope of the appended claims or sacrificing all of its material advantages.

Claims

1. An electrical connector (22) having a dielectric housing (24) including a transverse body section (26) and a shroud portion (39) extending forwardly therefrom to a leading edge (40), and further having an array of pin contact members (44) ex-

tending forwardly of said body section (26) and within a cavity (42) defined by said shroud portion (39) to respective leading ends (48) recessed inwardly of said leading edge (40) of said shroud portion (39) and spaced from sidewalls (38) of said shroud (39), said connector being characterized in that:

at least one pair of closely spaced elongate members (54, 64) are disposed within said shroud portion (39), said elongate members (54, 64) being between and spaced from said sidewalls and extending to respective leading ends (57, 67) forwardly beyond said leading edge (40) of said shroud portion (39), said elongate members (54, 64) cooperating with said shroud portion (39) to disallow inadvertent entry into said cavity (42) of a foreign object otherwise able to enter the cavity (42) proximate said recessed pin contacts adjacent said elongate members (54, 64) which would result in undesirable engagement with said adjacent pin contact members (44), whereby;

said pair of elongate members (54, 64) minimizes hazards from accidental contact with the adjacent pin contacts (44).

2. An electrical connector (22) of the type having a mating face subjected to a safety test wherein a test probe having a minimum diameter of about 6 mm (0.25 inches) is attempted to be inserted into said mating face for attempted engagement with any contact members therewithin, where any such engagement constitutes test failure, said connector (22) comprising a dielectric housing (24) including a transverse body section (26) and a shroud portion (39) extending forwardly therefrom to a leading edge (40) and an array of pin contact members (44) extending forwardly of said body section (26) and within a cavity (42) defined by said shroud portion (39) to respective leading ends (48) recessed inwardly of said leading edge (40) of said shroud portion (39), said pin contact members (44) being spaced from sidewalls of said shroud portion for mating with a complementary connector, the connector (22) being characterized in that:

at least one pair of closely spaced elongate members (54, 64) disposed within said shroud portion (39), said elongate members (54, 64) being between and spaced from said sidewalls (38) of said shroud portion (39) and extending upwardly from said transverse body section (26) to respective leading ends (57, 67) forwardly beyond said leading edge (40) of said shroud portion (39), said elongate members (54, 64) being adapted to be received within apertures (82) of said complementary connector (72), said elongate members (54, 64) cooperating with said

shroud portion (39) to define constricted cavity portions surrounding said elongate members (54, 64) effectively shaped and dimensioned small enough to prevent entry of a said test probe into said cavity portions, and thereby preventing engagement between said probe and said leading ends (48) of said contact members (44) therewithin.

3. The connector according to claim 1 or 2 wherein at least one (54) of said pair of elongate members is an alignment member cooperable with an alignment aperture of a complementary connector (72) to align the connectors (22, 72) when they are mated.

4. The connector according to claim 3 wherein one member (54) of said at least one pair of said elongate members (54, 64) is an alignment member and the other member (64) of said at least one pair is a key member.

5. The connector according to claim 4 wherein said transverse body section (26) includes identically configured seating apertures (36) for receiving mounting portions of said alignment and keying members therein thereby enabling placement of said alignment and keying members (54, 64) in any one of said apertures (36), thereby increasing the number of possible keying positions for said connector.

6. The connector according to claim 1 or 2 wherein at least one (64) of said pair of elongate members provides keying means for said connector when it is mated to a complementary connector.

7. The connector according to claim 6 wherein said transverse body section (26) includes location means for said pair of elongate members therein, said locating means assisting in the keying function whereby the location of said at least one keying member is interchangeable with that of the other elongate member, whereby said connector is adapted for customized assembly at a connector array of an apparatus.

8. The connector of any of claims 1 to 7 further including at least one other pin contact member having a leading end that extends essentially to the leading edge of said shroud portion (39).

9. A connector assembly comprising:
a receptacle member (22) according to any of claims 1 to 8; and
a complementary plug member (72) having a dielectric housing (74) including a corresponding array of socket contact members (84)

for mating with said pin contact members (44) of said receptacle (22) and further including apertures (82) for receiving said elongate members (54, 64) therein upon mating of said receptacle and plug members (22, 72).

Patentansprüche

1. Elektrischer Verbinder (22) mit einem dielektrischen Gehäuse (24), das einen querverlaufenden Körperbereich (26) und einen sich von diesem nach vorne zu einem vorderen Rand (40) erstreckenden Abdeckungsbereich (39) aufweist, und weiterhin mit einer Anordnung von Stiftkontaktelementen (44), die sich von dem Körperbereich (26) nach vorne sowie innerhalb eines durch den Abdeckungsbereich (39) definierten Hohlraums (42) zu jeweiligen vorderen Enden (48) erstrecken, die von dem vorderen Rand (40) des Abdeckungsbereichs (39) nach innen zurückgesetzt sind und von Seitenwänden (38) der Abdeckung (39) beabstandet sind, wobei der Verbinder dadurch gekennzeichnet ist, daß wenigstens ein Paar eng voneinander beabstandeter länglicher Elemente (54, 64) innerhalb des Abdeckungsbereichs (39) angeordnet ist, wobei die länglichen Elemente (54, 64) zwischen und im Abstand von den Seitenwänden angeordnet sind und sich nach vorne zu jeweiligen vorderen Enden (57, 67) jenseits des vorderen Rands (40) des Abdeckungsbereichs (39) erstrecken, wobei die länglichen Elemente (54, 64) mit dem Abdeckungsbereich (39) zusammenwirken, um einen unbeabsichtigten Zugang in den Hohlraum (42) durch einen Fremdkörper zu verhindern, der ansonsten in den Hohlraum (42) in der Nähe der den länglichen Elementen (54, 64) benachbarten zurückgesetzten Stiftkontakte eintreten kann und dies zu einem unerwünschten Eingriff mit den benachbarten Stiftkontaktelementen (44) führen würde, wodurch das Paar der länglichen Elemente (54, 64) die Gefahren aufgrund eines unbeabsichtigten Kontakts mit den benachbarten Stiftkontakten (44) auf ein Minimum reduziert.

2. Elektrischer Verbinder (22) des Typs mit einer Verbindungsseite, die einem Sicherheitstest unterzogen wird, bei dem versucht wird, eine Testsonde mit einem Mindestdurchmesser von ca. 6 mm (0,25 Inch) in die Verbindungsseite einzuführen, um zu versuchen, einen Eingriff mit irgendwelchen Kontaktelementen im Inneren desselben herzustellen, wobei jeglicher solcher Eingriff ein Testversagen darstellt, wobei der Verbinder (22) ein dielektrisches Gehäuse (24) mit einem querverlaufenden Körperbereich (36) und einem

sich von diesem nach vorne zu einem vorderen Rand (40) erstreckenden Abdeckungsbereich (39) sowie eine Anordnung von Stiftkontaktelementen (44) aufweist, die sich von dem Körperbereich (26) nach vorne und innerhalb eines durch den Abdeckungsbereich (39) definierten Hohlraums (42) zu jeweiligen vorderen Enden (48) erstrecken, die von dem vorderen Rand (40) des Abdeckungsbereichs (39) nach innen zurückgesetzt sind, wobei die Stiftkontaktelemente (44) zur Verbindung mit einem komplementären Verbinder von Seitenwänden des Abdeckungsbereichs beabstandet sind, und wobei der Verbinder (22) dadurch gekennzeichnet ist, daß wenigstens ein Paar eng voneinander beabstandeter länglicher Elemente (54, 64) innerhalb des Abdeckungsbereichs (39) angeordnet ist, wobei die länglichen Elemente (54, 64) zwischen und im Abstand von den Seitenwänden (38) des Abdeckungsbereichs (39) angeordnet sind und sich von dem querverlaufenden Körperbereich (26) nach oben zu jeweiligen vorderen Enden (57, 67) erstrecken, die sich vorne jenseits des vorderen Rands (40) des Abdeckungsbereichs (39) befinden, wobei die länglichen Elemente (54, 64) zur Aufnahme in Öffnungen (82) des komplementären Verbinders (72) ausgelegt sind, wobei die länglichen Elemente (54, 64) mit dem Abdeckungsbereich (39) zusammenarbeiten, um die länglichen Elemente (54, 64) umgebende, verengte Hohlraumbereiche zu definieren, die wirksam geformt und klein genug dimensioniert sind, um ein Eintreten der Testsonde in die Hohlraumbereiche zu verhindern, um dadurch einen Eingriff zwischen der Sonde und den vorderen Enden (48) der Kontaktelemente (44) in diesem zu verhindern.

3. Verbinder nach Anspruch 1 oder 2, wobei wenigstens eines (54) des Paares der länglichen Elemente ein Ausrichtungselement ist, das zum Zusammenwirken mit einer Ausrichtungsöffnung eines komplementären Verbinders (72) zum Ausrichten der Verbinder (22, 72) in ihrem miteinander verbundenen Zustand ausgelegt ist.
4. Verbinder nach Anspruch 3, wobei das eine Element (54) des wenigstens einen Paares länglicher Elemente (54, 64) ein Ausrichtungselement ist und das andere Element (64) des wenigstens einen Paares ein Codierelement ist.
5. Verbinder nach Anspruch 4, wobei der querverlaufende Körperbereich (26) identisch konfigurierte Sitzöffnungen (36) zum Aufnehmen von Befestigungsbereichen des

Ausrichtungs- und des Codierelements in diesen aufweist, um dadurch eine Platzierung des Ausrichtungs- und Codierelements (54, 64) in einer beliebigen der Öffnungen (36) zu ermöglichen und dadurch die Anzahl der möglichen Codierpositionen für den Verbinder zu steigern.

6. Verbinder nach Anspruch 1 oder 2, wobei wenigstens ein Element (64) des Paares länglicher Elemente eine Codiereinrichtung für den Verbinder schafft, wenn dieser mit einem komplementären Verbinder verbunden wird.
7. Verbinder nach Anspruch 6, wobei der querverlaufende Körperbereich (26) eine Festlegeeinrichtung für das Paar der länglichen Elemente in diesem aufweist, wobei die Festlegeeinrichtung bei der Codierfunktion von Hilfe ist und dadurch die Position des wenigstens einen Codierelements gegen die des anderen länglichen Elements austauschbar ist, wodurch der Verbinder für eine den Kundenwünschen angepaßte Montage an einer Verbinderanordnung einer Vorrichtung ausgelegt ist.
8. Verbinder nach einem der Ansprüche 1 bis 7, weiterhin mit wenigstens einem weiteren Stiftkontaktelement, das ein vorderes Ende aufweist, das sich im wesentlichen bis zu dem vorderen Rand des Abdeckungsbereichs (39) erstreckt.
9. Verbinderanordnung mit: einem buchsenartigen Element (22) nach einem der Ansprüche 1 bis 8; und mit einem komplementären steckerartigen Element (72) mit einem dielektrischen Gehäuse (74), das eine entsprechende Anordnung von Buchsenkontaktelementen (84) zur Verbindung mit den Stiftkontaktelementen (44) des buchsenartigen Elements (22) sowie Öffnungen (82) zum Aufnehmen der länglichen Elemente (54, 64) in diesen beim Verbinden des buchsenartigen und des steckerartigen Elements (22, 72) aufweist.

Revendications

1. Connecteur électrique (22) ayant un boîtier diélectrique (24) comprenant une section transversale (26) de corps et une partie de coquille (39) qui en fait saillie vers l'avant jusqu'à un bord avant (40), et ayant en outre un réseau d'éléments de contact à broches (44) faisant saillie vers l'avant de ladite section de corps (26) et à l'intérieur d'une cavité (42) définie par ladite partie de coquille (39) jusqu'à des extrémités avant respectives (48) en retrait vers l'intérieur dudit bord avant (40) de ladite partie de coquille (39) et

espacées des parois latérales (38) de ladite coquille (39), ledit connecteur étant caractérisé en ce que :

au moins une paire d'éléments allongés et rapprochés (54, 64) est disposée à l'intérieur de ladite partie de coquille (39), lesdits éléments allongés (54, 64) étant situés entre lesdites parois latérales et à distance de celles-ci et s'étendant jusqu'à des extrémités avant respectives (57, 67) situées en avant et au-delà dudit bord avant (40) de ladite partie de coquille (39), lesdits éléments allongés (54, 64) coopérant avec ladite partie de coquille (39) pour s'opposer à une entrée accidentelle dans ladite cavité (42) d'un objet étranger pouvant autrement pénétrer dans la cavité (42) à proximité desdits contacts à broches en retrait adjacents auxdits éléments allongés (54, 64), ce qui entraînerait un contact indésirable avec lesdits éléments de contact à broches adjacents (44), grâce à quoi :

ladite paire d'éléments allongés (54, 64) minimise les risques d'un contact accidentel avec les contacts à broches adjacents (44).

2. Connecteur électrique (22) du type ayant une face d'accouplement soumise à un essai de sécurité dans lequel on essaye d'insérer une sonde de sécurité, ayant un diamètre minimal d'environ 6 mm (0,25 inch), dans ladite face d'accouplement pour essayer de la faire entrer en contact avec tous éléments de contact se trouvant à l'intérieur de cette face, une telle entrée en contact constituant un échec pour l'essai, ledit connecteur (22) comportant un boîtier diélectrique (24) comprenant une section transversale (26) de corps et une partie de coquille (39) qui en fait saillie vers l'avant jusqu'à un bord avant (40), et un réseau d'éléments de contact à broches (44) faisant saillie vers l'avant de ladite section de corps (26) et à l'intérieur d'une cavité (42) définie par ladite partie de coquille (39) jusqu'à des extrémités avant respectives (48) en retrait vers l'intérieur dudit bord avant (40) de ladite partie de coquille (39), lesdits éléments de contact à broches (44) étant espacés de parois latérales de ladite partie de coquille pour s'accoupler avec un connecteur complémentaire, le connecteur (22) étant caractérisé en ce que :

au moins une paire d'éléments allongés et rapprochés (54, 64) est disposée à l'intérieur de ladite partie de coquille (39), lesdits éléments allongés (54, 64) étant entre lesdites parois latérales (38) de ladite partie de coquille (39) et en étant espacés, et faisant saillie vers le haut de ladite section transversale (26) de corps jusqu'à des extrémités avant respectives (57, 67) en avant et au-delà dudit bord avant (40) de ladite partie de coquille (39), lesdits éléments allongés

(54, 64) étant destinés à être reçus à l'intérieur d'ouvertures (82) dudit connecteur complémentaire (72), lesdits éléments allongés (54, 64) coopérant avec ladite partie de coquille (39) pour définir des parties de cavité resserrées entourant lesdits éléments allongés (54, 64), configurées de façon assez efficace et de dimension assez petite pour empêcher l'entrée de ladite sonde d'essai dans lesdites parties de la cavité, et empêcher ainsi une entrée en contact entre ladite sonde et lesdites extrémités avant (48) desdits éléments de contact (44) à l'intérieur de la cavité.

3. Connecteur selon la revendication 1 ou 2, dans lequel au moins l'un (54) des éléments allongés de ladite paire est un élément d'alignement pouvant coopérer avec une ouverture d'alignement d'un connecteur complémentaire (72) pour aligner les connecteurs (22, 72) lorsqu'ils sont accouplés.
4. Connecteur selon la revendication 3, dans lequel un élément (54) de ladite, au moins une, paire desdits éléments allongés (54, 64) est un élément d'alignement et l'autre élément (64) de ladite, au moins une, paire est un élément détrompeur.
5. Connecteur selon la revendication 4, dans lequel ladite section transversale (26) de corps présente des ouvertures (36) de logement de configurations identiques destinées à recevoir des parties de montage desdits éléments d'alignement et de détrompage, afin de permettre la mise en place desdits éléments (54, 64) d'alignement et de détrompage dans l'une quelconque desdites ouvertures (36), pour augmenter ainsi le nombre de positions possibles de détrompage pour ledit connecteur.
6. Connecteur selon la revendication 1 ou 2, dans lequel au moins l'un (64) des éléments allongés de ladite paire constitue un moyen de détrompage pour ledit connecteur lorsqu'il est accouplé avec un connecteur complémentaire.
7. Connecteur selon la revendication 6, dans lequel ladite section transversale (26) de corps comprend des moyens de positionnement pour ladite paire d'éléments allongés dans cette section de corps, lesdits moyens de positionnement assistant la fonction de détrompage de manière que le positionnement dudit, au moins un, élément de détrompage soit interchangeable avec celui de l'autre élément allongé, grâce à quoi ledit connecteur est conçu pour un assemblage adapté sur mesure à un ensemble de connecteurs d'un appareil.

8. Connecteur selon l'une quelconque des revendications 1 à 7, comprenant en outre au moins un autre élément de contact à broche ayant une extrémité avant qui s'étend essentiellement jusqu'au bord avant de ladite partie de coquille (39). 5

9. Assemblage de connecteur comportant :
un élément femelle (22) selon l'une quelconque des revendications 1 à 8 ; et
un élément mâle complémentaire (72) 10
ayant un boîtier diélectrique (74) comprenant un réseau correspondant d'éléments de contact à douilles (84) pour s'accoupler avec lesdits éléments de contact à broches (44) dudit élément femelle (22), et comprenant en outre des ouvertures (82) destinées à recevoir lesdits éléments allongés (54, 64) lors d'un accouplement desdits éléments femelle et mâle (22, 72). 15

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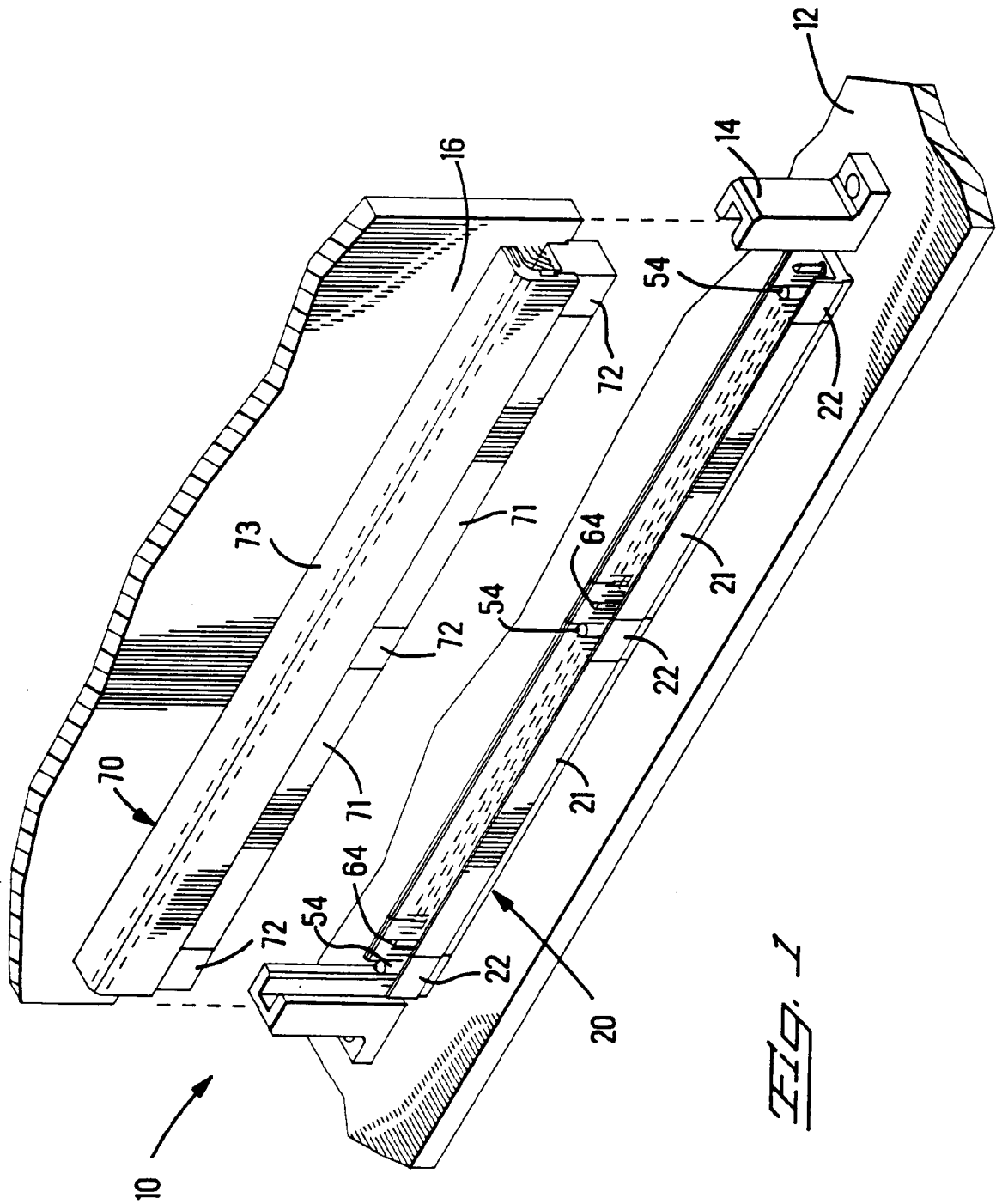
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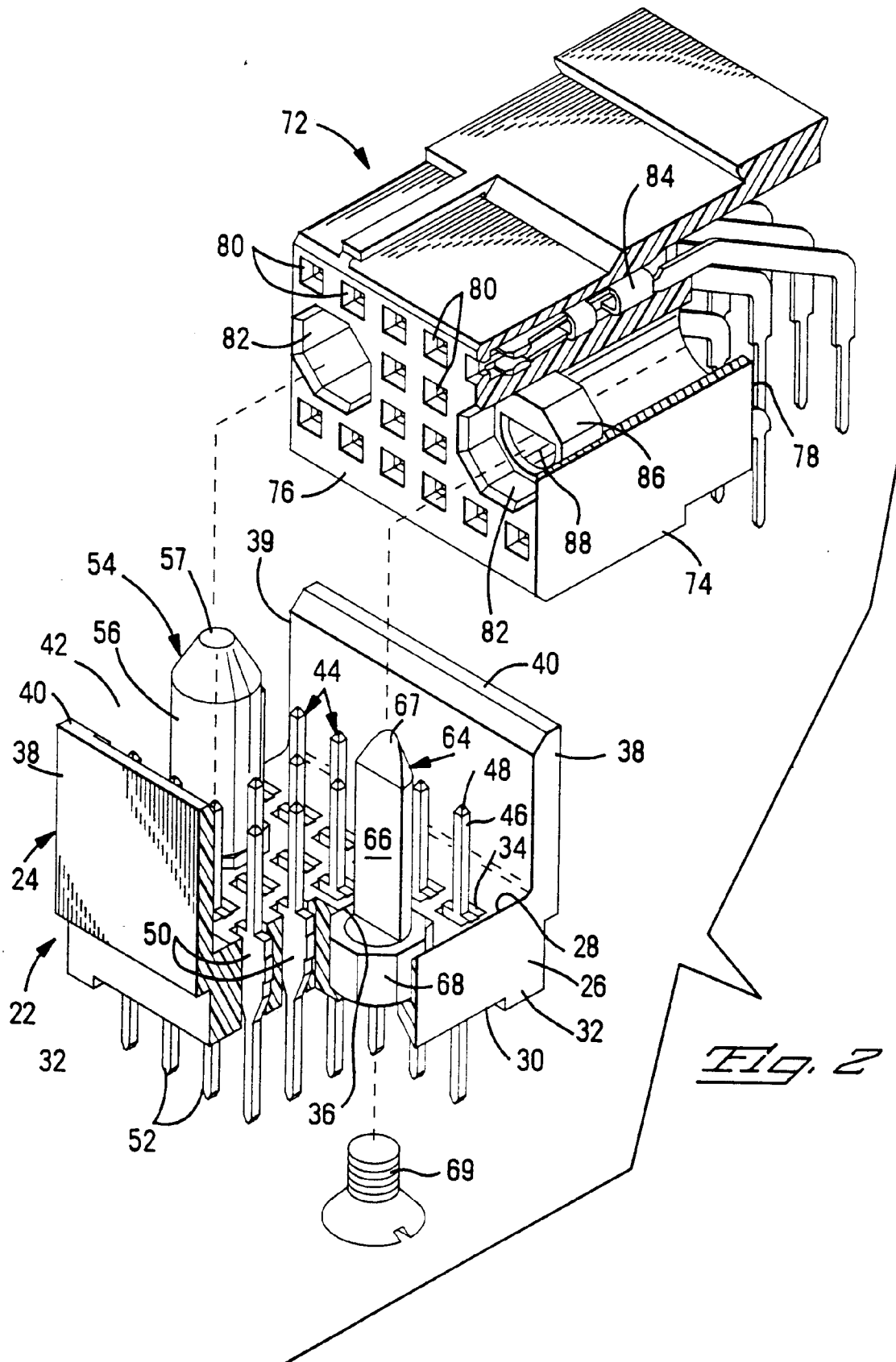
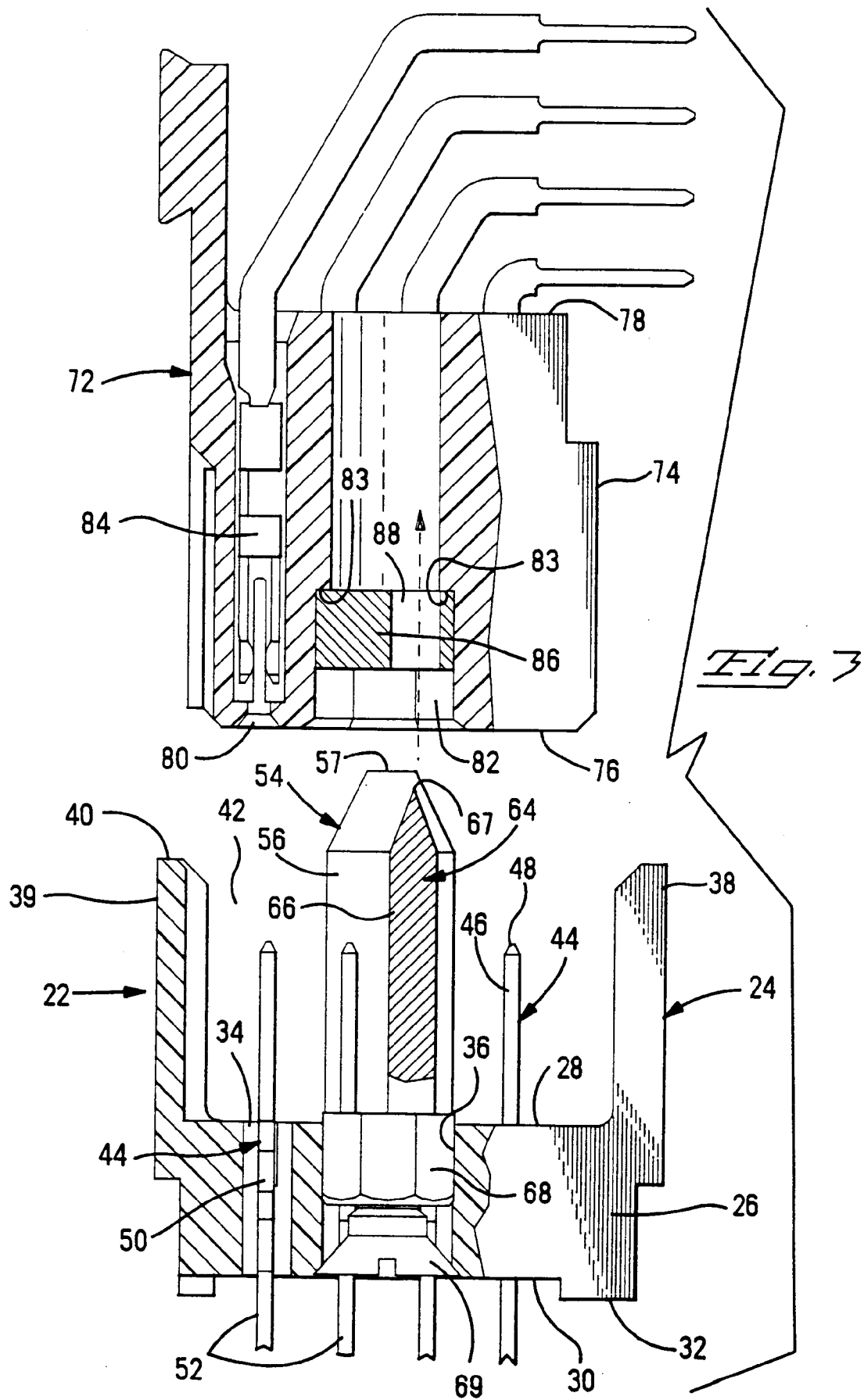


Fig. 2



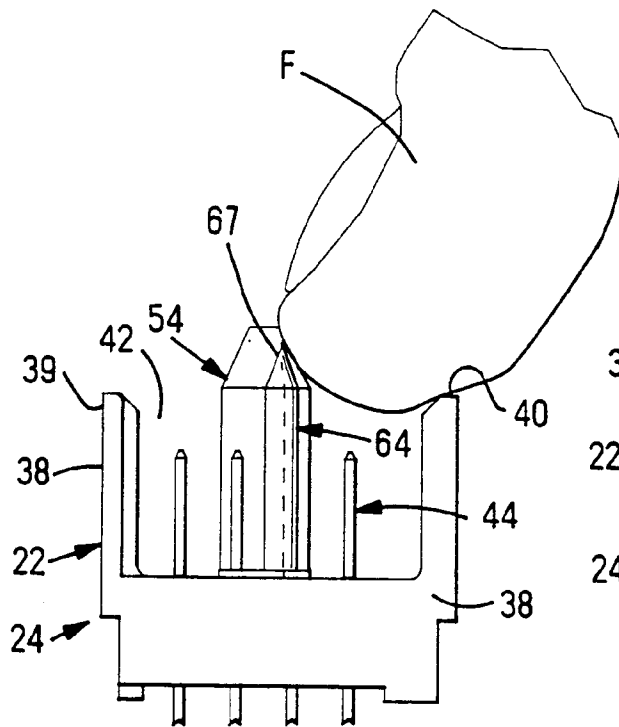


Fig. 4

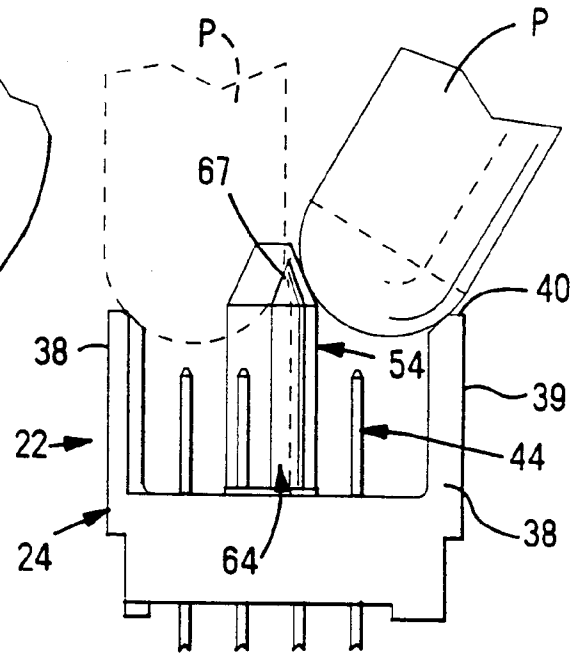


Fig. 5

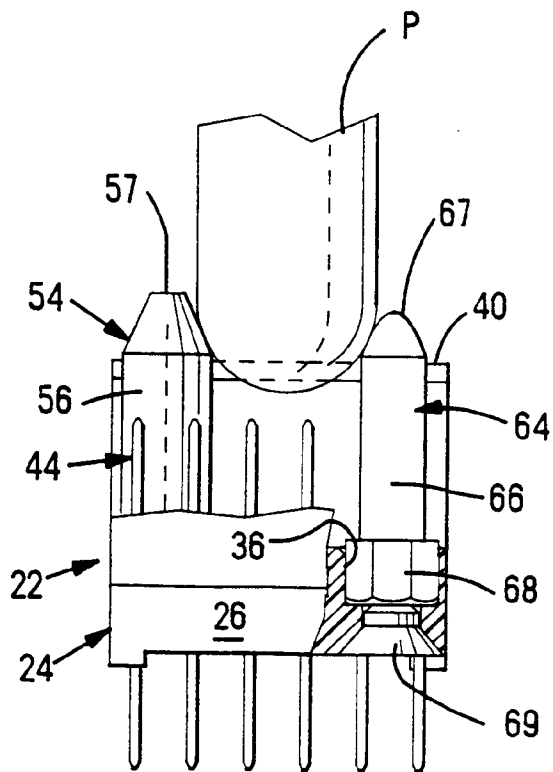


Fig. 6

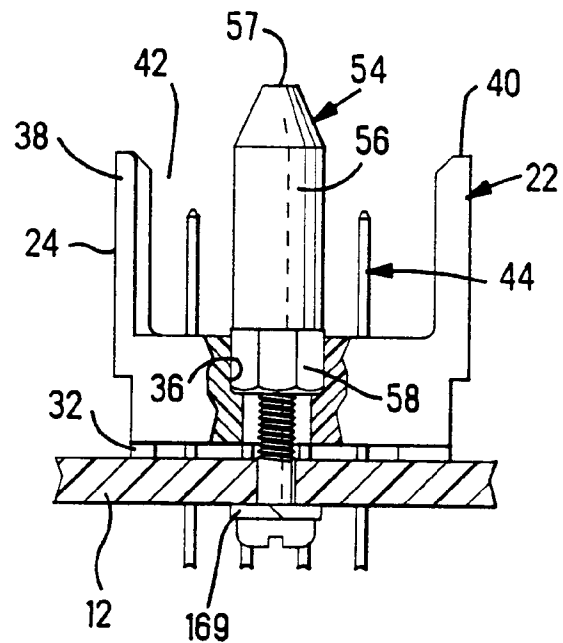


Fig. 7

