(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 180 343 B1**

(12) EUROPEAN PATENT SPECIFICATION

(45) Date of publication of patent specification: **27.02.91**

(51) Int. Cl.[5]: **H01R 13/28**, H01R 13/428, H01R 13/514, H01R 13/516

(21) Application number: **85307077.9**

(22) Date of filing: **03.10.85**

(54) Electrical contact module and housing.

(30) Priority: **08.10.84 GB 8425406**
07.02.85 GB 8503075
23.05.85 GB 8513067

(43) Date of publication of application:
07.05.86 Bulletin 86/19

(45) Publication of the grant of the patent:
27.02.91 Bulletin 91/09

(84) Designated Contracting States:
BE DE FR GB IT NL SE

(56) References cited:
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IBM TECHNICAL DISCLOSURE BULLETIN, vol. 14, no. 9, February 1972, page 2843, New York, US; E.C. UBERBACHER: "Electrical connector assembly"

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Description

In GB-A-121742 there is described and illustrated a form of electrical coupler for multi-conducting cables in which the individual contacts are located in contact modules which are built up into an assembly which is then inserted as a whole into a housing. In such an arrangement, it is not possible to remove any one contact module individually from the housing.

Also, the distal ends of the contacts protrude from their contact modules, which leads to a considerable risk of damage.

It is an object of the invention to provide a contact module for a modular housing system for electrical contacts whereby contact banks of required size may be made up from common or modular parts which may be individually inserted into and removed from a housing for the whole bank.

In UK Patent Specification 1503505 a connector element incorpoorates electrical terminals which are held in channels only when the connector is fully assembled. The present invention provides an improvement for locating and holding of the electrical terminals during assembly and before final assembly of a connector element.

In accordance with the invention there is provided a contact module comprising a body adapted to be individually slidably received and located in a housing in close lateral proximity to other similar bodies, and at least one contact received or receivable in an individual groove in the body so as to project from the body at one end to make an external connection and having a distal end for cooperation with a further contact, the contact having a configuration co-operable with a corresponding formation in the groove to prevent longitudinal movement of the contact in the groove , characterised in that each contact has a resilient part adapted to be engaged by an abutment provided in the groove to inhibit lateral movement of the contact out of the groove.

The abutment may be L-shaped having an undercut which receives and bears against the edge part of the contact.

The contacts may be formed of two spring leaves diverging away from a zone of resilient contact so that the zone of resilient contact may receive one of the leaves of a similar contact directed towards it.

In use, the contact modules will be slid individually and in close contact into a housing, so that movement of the contact out of the grooves will be prevented, either by the housing itself or, in most cases, by the adjacent contact module body. By having the contact modules individually slidable and locatable in the housing, the individual contacts may be accessed, e.g. for changing, if required, without disturbing the adjacent contacts.

The use of a modular arrangement enables the user to use any of a variety of arrangements, and in particular, if a high current contact, with correspondingly high heat dissipation requirements, is used in a housing with low current contacts, adjacent contact grooves may be left vacant.

It is preferred that the bodies shall each have a portion deflectable so as to snap fit into the housing, and also so as to be releasable from the snap fit when required.

It is also preferred that the distal ends of the contacts should not protrude beyond the ends of their respective grooves. Preferably the contacts are hermaphroditic.

The bodies are made usable with either male or female housings, being inserted one way up in the male housings and the reverse way up in the female housings. Similarly, one contact of two in the body may be isolated from one adjacent contact by means of a further wall located in a position offset from the median plane of the body.

Alternatively, the contacts may be isolated from the contacts of adjacent modules by a laterally offset wall, which avoids the necessity for inverting the modules in male and female housings.

The contacts themselves may be formed of two spring leaves diverging away from a zone of resilient contact so that the zone of resilient contact may receive one of the leaves of a similar contact directed towards it. The contacts are thus hermaphroditic.

The invention will be further described with reference to the accompanying drawings which illustrate embodiments of the invention, and in which:

Figure 1 is an exploded view of a female housing including modular bodies and one contact;

Figure 2 is a perspective view to an enlarged scale showing some details of the contact and body;

Figure 3 is a perspective view of a male housing to co-operate with the female housing shown in figure 1; and

Figure 4 is a view similar to part of figure 1 showing a modification; and

Turning now to figures 1 to 3, there is illustrated in figure 1 a female housing 21 having a group of modular bodies 22 in position therein. Grooves 21a are shown moulded into the housing 21 to improve grip thereon. Figure 1 also shows one modular body 22 removed from the housing 21. It will be seen that this body has a latching arm 23 which is generally similar to the latching arm 7 described above, although the ramps 23a are rather more gently inclined and longer. Also, the portion 23b between the ramps 23a has square sides

to slide between square form barriers within the housing 21. The latching arm 23 cooperates with a matching formation (not shown) within the housing 21.

The body 22 has first and second contact-receiving grooves or recesses 24, and these grooves continue into extension recesses 25 bounded by an offset lateral wall 26. The extension recesses 25 and wall 26 are also visible on the bodies shown within the female housing 21.

Each groove 24 is provided with an abutment 27 (see also figure 2). The grooves 24 also widen out at the ends opposite the extensions 25 to form extension recesses 28 receiving an enlarged contact end 29 which is crimped over a lead 31.

It will be seen that the contact illustrated in figure 1 is formed of two leaves 32 and 33 which have divergent end portions 32a and 33a respectively, and form a zone of contact 35 from where the divergent ends commence.

The zone of contact 35 is resilient so that a leaf of a similar contact introduced longitudinally will be received and held in the zone of contact to provide good electrical contact. This is achieved automatically when a male housing 36 (see figure 3) is introduced into and united with the female housing 21.

The leaf 33 is provided with a slot or recess 37 which, as shown more particularly in figure 2, cooperates with the abutment 27 to prevent longitudinal movement of the contact in the slot. Further, the lower edge of the slot 37 is provided with a resilient tongue 38 which is somewhat deflected on introduction of the contact into the slot and bites into the lower surface of the abutment 27 to provide a degree of inhibition of removal of the contact in a lateral direction. Accordingly, the contact will not readily fall out of its body.

It will be seen that the distal ends of tie contact leaves are somewhat offset axially with respect to a median axial plane of the body 22, and the configuration of the wall 26 and extensions 25 is also axially offset, as may best be seen in figure 1 in respect of the bodies visible within the housing 21.

When a similar body 22 is introduced end-to-end and the same way up, i.e. with the latching arm 23 uppermost, it will be seen that the offsetting of the walls 26 and end configuration enables the modules in the male housing to be introduced between the modules in the female housing so that the contacts meet and one leaf enters between the two leaves of the other contact. The contacts may thus be deemed to be hermaphroditic since it is not necessary to provide different types of male and female contact, but a common design is used.

Figure 1 also shows that the female housing is provided with lateral extensions 41 having recesses 42 which receive resilient arms 43 (see figure 7) on the male housing 36. These arms 43 are provided with latching lugs 44 having lead-in surfaces 45 to engage and snap over appropriate surfaces (not shown) arranged within each of the recesses 42. The two parts of the housing are thus releasably mated together, and the design is such that when the latching lugs 44 snap into position, the contacts in the various bodies 22 are in firm contact with their opposed contacts. The housing parts 21 and 36 may be readily released for separation by manual pressure on the arms 43. In order to improve manual engagement with the arms 43, they are provided with moulded-in grooves 43a.

The male housing 36 is shown in figure 3 as having an enlarged rear end 61, which is of the same overall dimensions as the rear of the female housing 21, thereby facilitating the use of a common form of sealing grommet (not shown) for splash-proofing of the housings.

Figure 1 further shows a mounting device comprising a base 51 adapted to be attached to a panel or the like. The base 51 is provided with a pair of resilient arms 52 ending in latching lugs 53 with lead-in surfaces 54 and forming shoulders 55 to provide a snap fit when introduced between the extensions 41 and further extensions 56 located therebehind so as to form a slot 57 of substantially the width of the arms 52, and provided with an abutment or keeper surface which is just visible at 58.

Turning now to figure 4, this shows a modified form of retention for the contact by the abutment 27a. In this arrangement, the abutment 27a is of L section to provide an undercut 27b which receives and engages the lower edge of the slot 37 to hold the contact against lateral movement. In order to achieve this, the contact has to be introduced at an angle and twisted into its final position. Removal may also be effected by an initial twist to release the edge of the slot 37 from the undercut 27b. It will be noted that the tine or tongue 38 has been omitted.

Claims

1. A contact module comprising a body (22) adapted to be individually slidably received and located in a housing (21, 36) in close lateral proximity to other similar bodies, and at least one contact (32, 33) received or receivable in an individual groove (24) in the body (22) so as to project from the body (22) at one end (29) to make an external connection and having a distal end (32a, 33a) for co-operation with a further contact, the contact (32, 33) having a configuration (12, 37) co-operable

with a corresponding formation (27) in the groove (24) to prevent longitudinal movement of the contact (32, 33) in the groove (2, 24), characterised in that each contact has a resilient part (38) adapted to be engaged by an abutment (27a) provided in the groove to inhibit lateral movement of the contact out of the groove.

2. A contact module as claimed in claim 1, characterised in that the abutment (27a) is L-shaped having an undercut (27b) which receives and bears against an edge (37) of the resilient part (38) of the contact.

3. A contact module as claimed in claim 1 or 2, characterised in that the contacts are formed of two spring leaves (32,33) diverging away from a zone (35) of resilient contact so that the zone of resilient contact may receive one of the leaves of a similar contact directed towards it.

Revendications

1. Module de contact comportant un corps (22) conçu pour être individuellement introduit, par coulissement, et logé dans un boîtier (21, 36) immédiatement à côté d'autres corps semblables, et au moins un contact (32,33) introduit, ou pouvant être introduit, dans une rainure individuelle (24) prévue dans le corps (22) de façon à dépasser du corps (22) à une extrémité (29) pour réaliser une connexion extérieure, et présentant une extrémité (32a, 33a), du côté opposé à la connexion, pouvant coopérer avec un autre contact, le contact (32, 33) présentant une configuration (37) prévue pour coopérer avec une formation correspondante (27) prévue dans la rainure (24) pour empêcher le mouvement longitudinal du contact (32, 33) dans la rainure (24), caractérisé par le fait que chaque contact comporte une partie élastique (38) conçue pour venir en prise avec une butée (27a) prévue dans la rainure pour empêcher que le contact ne sorte de la rainure par déplacement latéral.

2. Module de contact selon la revendication 1, caractérisé par le fait que la butée (27a) est en forme de L présentant une entaille (27b) qui reçoit un bord (37) de la partie élastique (38) du contact et porte contre ce bord.

3. Module de contact selon la revendication 1 ou 2, caractérisé par le fait que les contacts sont formés de deux branches élastiques (32, 33) qui divergent à partir d'une zone (35) de contact élastique de façon que la zone de contact élastique puisse recevoir l'une des branches d'un contact semblable dirigé vers ce contact.

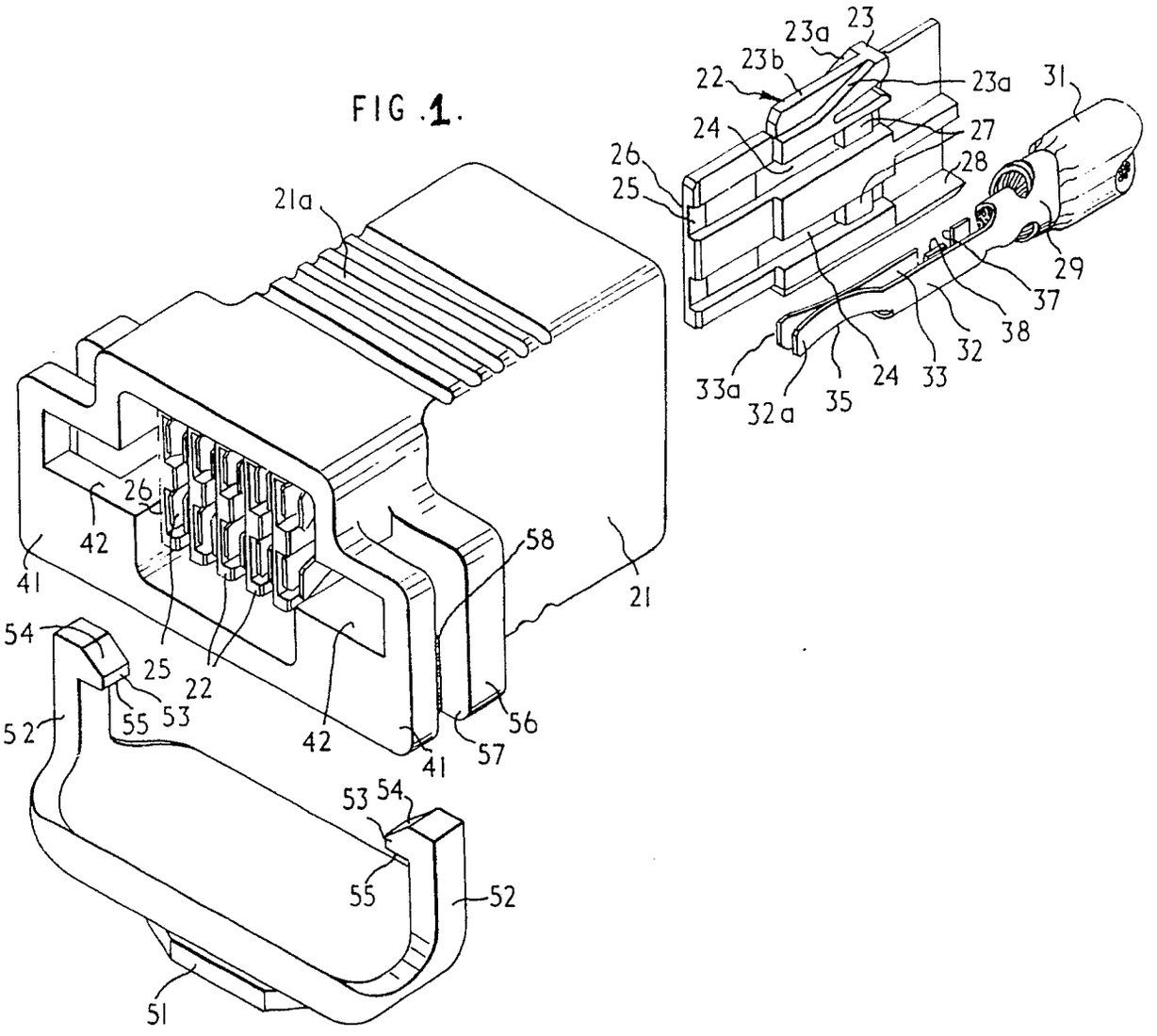
Ansprüche

1. Kontaktmodul mit einem Körper (22), der einzeln in einem Gehäuse (21, 36) verschiebbar aufgenommen wird und in enger seitlicher Nachbarschaft zu anderen ähnlichen Körpern angeordnet ist, und mindestens einem Kontakt (32, 33), der in einer Einzelnut (24) im Körper (1, 22) derart aufgenommen oder aufnehmbar ist, daß er vom Körper (22) an einem Ende (29) vorsteht, um eine externe Verbindung herzustellen und ein distales Ende (32a, 33a) zum Zusammenwirken mit einem weiteren Kontakt hat, und der Kontakt (32, 33) eine Ausgestaltung (12, 37) hat, die mit einer entsprechenden Ausbildung (27) in der Nut (24) zusammenwirkt, um eine Längsbewegung des Kontaktes (32, 33) in der Nut (2, 24) zu verhindern, dadurch gekennzeichnet, daß jeder Kontakt einen elastischen Teil (38) hat, der von einem in der Nut vorgesehenen Anschlag (27a) erfaßt werden kann, um eine seitliche Bewegung des Kontakts aus der Nut heraus zu verhindern.

2. Kontaktmodul nach Anspruch 1, dadurch gekennzeichnet, daß der Anschlag (27a) L-förmig ist und eine Unterschneidung (27b) aufweist, die eine Kante (37) des elastischen Teils (38) des Kontakts aufnimmt und sich gegen diese legt.

3. Kontaktmodul nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß die Kontakte aus zwei Federblättern (32, 33) gebildet werden, die von einer elastischen Kontaktzone (35) weg divergieren, so daß die elastische Kontaktzone eines der Federblätter eines ähnlichen, gegen sie gerichteten Kontakts aufnehmen kann.

FIG. 1.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23b
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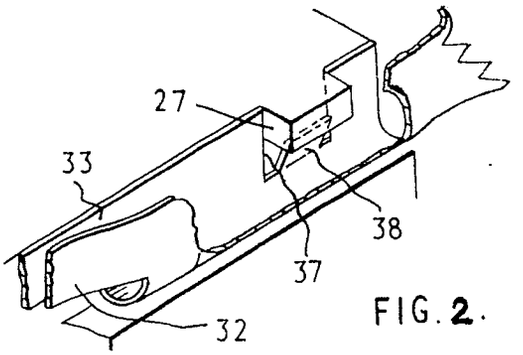
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FIG. 2.

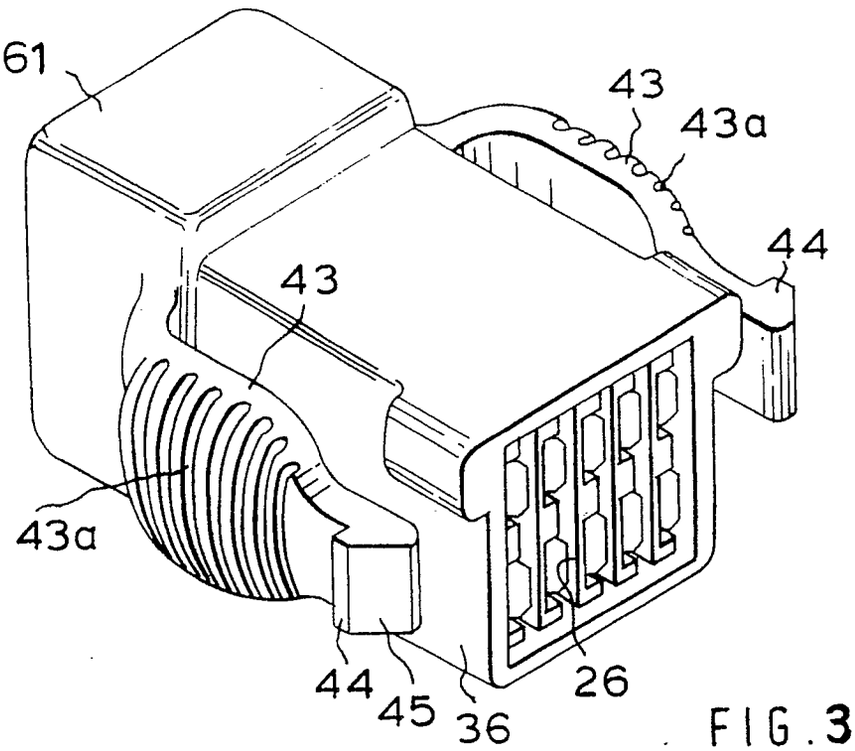

FIG. 3.

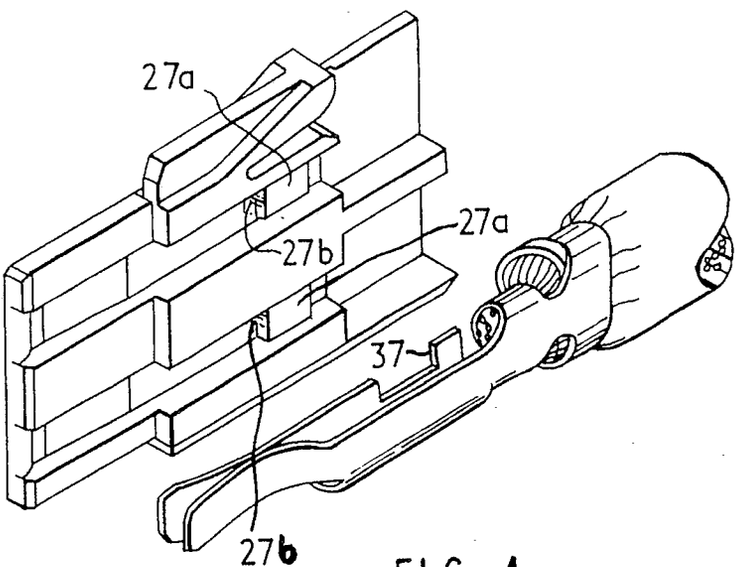

FIG. 4.