

(19)



(11)

EP 2 144 336 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
09.03.2011 Bulletin 2011/10

(51) Int Cl.:
H01R 24/84 (2011.01)

(21) Application number: **09163994.8**

(22) Date of filing: **29.06.2009**

(54) **Hermetic two-pole or multipole electrical connector**

Luftdichter zweipoliger oder mehrpoliger Stecker

Connecteur électrique multipolaire ou bipolaire hermétique

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL
PT RO SE SI SK TR**

(30) Priority: **30.06.2008 IT PD20080197**

(43) Date of publication of application:
13.01.2010 Bulletin 2010/02

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Description

[0001] The present invention relates to a hermetic two-pole or multipole electrical connector.

[0002] Hermetic connection devices, designed to provide electrical contacts in particularly damp or even wet areas as may occur in a refrigerator or in a heat exchange machine (climate control unit and the like,) are currently known and widespread.

[0003] Generally, in conventional non-hermetic connection devices and connectors, the electrical cables are inserted easily in holes that have a larger cross-section than such cables; instead, in hermetic connection devices and in general in hermetic connectors, in order to provide tightness with respect to water and moisture, the spaces provided between the cables and at least the regions for feeding such cables into the respective insertion holes must be obstructed by means of suitably contoured sealing elements.

[0004] These known types of hermetic connection device are shown for the sake of simplicity in the accompanying Figure 1, which is an exploded view thereof, and are generally designated by the reference letter A. The connection devices A comprise two connectors, a first male connector B and a second female connector C, with two or more poles, the first male connector B having tubular parts D that extend from a central body E to surround corresponding male terminals F inserted in such central body.

[0005] A central body G of the second female connector C has tubular seats H which accommodate female terminals F' for coupling with the male terminals F of the first connector B, which are shaped complementarily with respect to the tubular parts D of the first connector B.

[0006] The two connectors B and C are joined by snap engagement tabs L.

[0007] The tightness of the connection device A is provided by

- a first sealing element M, which is contoured so as to surround at the base the protruding tubular parts D of the first male connector B, and is provided separately and therefore adapted to be mounted by hand on such first connector,
- a second sealing element N, which is formed by cylindrical protrusions P designed to be each crossed axially by an electrical cable R (with the male terminal F) for wiring, thus providing the seal on such cables; the cylindrical protrusions P protrude from a flat base S designed to provide a perimetric seal on a free face T of the first connector B, the second element N being designed to be installed manually with the electrical cables R and forced, again manually, in corresponding seats V formed in the central body E of the first connector B,
- a third sealing element N', which is fully similar to the second element N and is formed by cylindrical protrusions P' designed to be each crossed axially

by an electrical cable R' (with a female terminal F') for wiring, thus providing the seal on such cables; the cylindrical protrusions P' extend from a flat base S' designed to provide the perimetric seal on a free face T' of the second connector C, the third element N' being designed to be provided manually with the electrical cables R' and forced, again manually, in corresponding seats formed in the central body G of the second connector C.

[0008] The provision of such known type of hermetic connection device therefore reveals some limitations.

[0009] A first limitation lies in the need to provide separately and to assemble manually the described sealing elements, with significant costs in terms of molding equipment, assembly time and therefore labour.

[0010] A second limitation is that it is necessary to provide two different connectors, a male one and a female one, each of which requires the preparation of a dedicated mold.

[0011] Moreover, such first and second connectors, being long known and in use, are not structured to ensure the anti-flammability safety distances from a hot body in contact that are imposed by applicable national and international statutory provisions.

[0012] EP 0 549 269 A1 discloses a waterproof electrical connector according to the preamble of claim 1 having a main body with a terminal accommodating chamber and a pair of covers integrally formed through a membrane hinge on both sides of the rear portion of the main body, whereby when closed together the covers define an opening through which electric wires extend into the chamber. A rubber seal is mounted on the inner face of each cover to adhere on the electric wire and locking means are provided to lock the covers together in the closed condition.

[0013] The aim of the present invention is to provide a hermetic two-pole or multipole electrical connector that is capable of obviating the above-mentioned drawbacks of known devices.

[0014] Within this aim, an object of the present invention is to provide a hermetic connector that is simpler and quicker to install with respect to known connectors and equally quick to mate in order to provide a hermetic connection device.

[0015] Another object of the present invention is to provide a connector whose installation requires less labour than known connectors.

[0016] Another object of the present invention is to provide a hermetic connector that is less expensive in terms of equipment for providing its components.

[0017] Another object of the present invention is to provide a hermetic connector whose mechanical performance is not inferior to that of known connectors and which is safer in terms of anti-flammability, in accordance with applicable statutory provisions at the national and international level.

[0018] Another object of the present invention is to pro-

vide a hermetic two-pole or multipole electrical connector that can be manufactured with known equipment and technologies.

[0019] In accordance with the invention, there is provided a hermetic two-pole or multipole electrical connector, as defined in the appended claims.

[0020] Further characteristics and advantages of the invention will become better apparent from the following detailed description of a preferred but not exclusive embodiment thereof, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is an exploded top view of a hermetic connection device according to the background art;

Figure 2 is a first perspective view of a connector according to the invention in the open configuration;

Figure 3 is a second perspective view of the connector according to the invention in the open configuration;

Figure 4 is a top view of the connector according to the invention in the open configuration;

Figure 5 is a sectional view, taken along the longitudinal plane V-V of Figure 4, of the connector according to the invention in the open configuration;

Figure 6 is a sectional view of two facing half-shells of a hermetic containment and sealing portion of the connector according to the invention;

Figure 7 is a top view of the hermetic connection device composed of two identical connectors according to the invention;

Figure 8 is a side view of the device of Figure 7;

Figure 9 is a sectional view, taken along the line IX-IX of the device of Figure 8.

[0021] With reference to the figures, a hermetic two-pole or multipole electrical connector according to the invention is designated generally by the reference numeral 10.

[0022] The hermetic electrical connector 10 comprises a central engagement portion 11 for at least two electrical terminals.

[0023] In the embodiment of the connector 10 according to the invention described here by way of non-limiting example of the invention, the portion 11 is for the engagement of two electrical terminals, respectively 12 and 13, which are shown in Figure 9.

[0024] A corresponding number of laterally adjacent tubular parts 14 and 15, a first male tubular part 14 and a first female tubular part 15, extend from the central portion 11 so as to surround the terminals 12 and 13.

[0025] Each one of the tubular parts 14 and 15 is designed to mate with a corresponding female tubular part 15a and male tubular part 14a of an associated similar electrical connection element and in particular of an identical additional second connector 10a according to the invention, as shown in Figures 6, 7 and 8.

[0026] The connector 10 holds, in the illustrated example of embodiment, two terminals 12 and 13, which are of a male cylindrical type, while the second connector 10a bears female cylindrical terminals 12a and 13a.

[0027] A hermetic closure and containment portion 16 for segments 17 and 18 for crimping the terminals 12 and 13 to respective electrical cables 19 and 20 extends from the central portion 11, opposite with respect to the tubular parts 14 and 15.

[0028] The hermetic containment portion 16 is formed by two half-shells 21 and 22 designed to close onto each other.

[0029] The two half-shells 21 and 22 are articulated to the central portion 11 by way of hinge means.

[0030] Such hinge means, in the exemplifying embodiment of the invention, are constituted, for each half-shell, by a bridge-like hinge 23 and 24, which is provided simultaneously with the monolithic molding of the central portion 11 with the tubular parts 14 and 15 and of the half-shells 21 and 22, with such half-shells in the open configuration.

[0031] The hermetic electrical connector 10 according to the invention also comprises reversible extraction-preventing means for quick coupling to a similar corresponding associated electrical connection element, described better hereinafter.

[0032] The electrical connector 10 is also characterized in that it comprises a series of spacing ribs, designated by the reference numerals 25 and 26, which are designed to ensure a predefined safety distance for a body in contact.

[0033] The hermetic sealing elements for the half-shells 21 and 22 are constituted by:

- a first gasket 28 and 29, which is overmolded at the regions where the half-shells 21 and 22 surround the electrical cables 19 and 20 proximate to the crimping 17 and 18, and at the surfaces of the first half-shell 21 that are designed to abut against the corresponding surfaces of the second half-shell 22 in the closed configuration,
- a second gasket 30, which is arranged at the base of the male tubular part 14, between such base and the head of the female tubular part 15a of the identical second connector 10a.

[0034] Such first and second gaskets are both overmolded on the open half-shells 21 and 22 and on the central portion 11, respectively.

[0035] This avoids the separate provision of the gaskets and provides savings in terms of assembly of such gaskets, as instead occurs for known types of connector

and connection device.

[0036] The two half-shells 21 and 22 are retained in the closed configuration on each other by snap-acting interlocking means, which are constituted by a pair of opposite engagement teeth 31 that protrude laterally from the second half-shell 22 and are adapted to each enter by snap action a corresponding opening 32 formed on a shoulder 33 that extends from the corresponding side of the first half-shell 21.

[0037] The extraction-preventing means for quick coupling with a similar corresponding associated electrical connection element, exemplified here as an identical second hermetic electrical connector 10a according to the invention, are provided by a snap-acting engagement tab 34, which protrudes from the central portion 11 and cantilevers out laterally with respect to the male tubular part 14.

[0038] The tab 34 has, at the end that lies on the side of the tubular parts 14 and 15, a first tooth 35 for snap-acting engagement with a corresponding second tooth 36a formed on an associated connection element, or at the end of the female tubular part 15a of the second connector 10a according to the invention, and at the opposite end a maneuvering tail 37 for manual disengagement of the tab 34.

[0039] A bridge 38 for connecting the tab 34 to the central portion 11 is elastically deformable.

[0040] The quick engagement means also comprise a second tooth 36, which protrudes at the end of the female tubular part 15 and is available for engagement with a first tooth 35a of a tab 34a for the snap engagement of the second associated identical electrical connector 10a.

[0041] The spacing ribs 25 and 26, as well as 25a and 26a of the second connector 10a, are defined so as to protrude from the outer surfaces of the half-shells 21 and 22.

[0042] The connector 10 according to the invention is completed by a third gasket 40, which is molded on the central portion 11 around the inlets of engagement seats 41 for the male terminals 12 and 13, as shown in Figures 2 and 5.

[0043] One of the features of the electrical connector 10 according to the invention is indeed that it is designed for quick and reversible engagement with another second identical electrical connector 10a provided with male and/or female terminals designed for mating with the corresponding female and/or male terminals of the first electrical connector 10.

[0044] In practice it has been found that the invention thus described achieves the intended aim and objects.

[0045] In particular, the present invention provides a hermetic connector that is simpler and quicker to install and equally quick to mate for the provision of a hermetic connection device.

[0046] The connector 10 according to the invention in fact has overmolded gaskets 28, 29, 30 and 40, with advantages in terms of production of a smaller number of components and therefore in terms of labor and assem-

bly times.

[0047] Moreover, the present invention provides a hermetic connector that is less expensive in terms of equipment for providing its components, since it is not necessary to provide molds dedicated to the production of the seals to be assembled at a later time.

[0048] Moreover, the present invention provides a hermetic connector that is safer in terms of anti-flammability, in accordance with applicable statutory provisions at the national and international level, by way of the ribs 25 and 26, which are sized and positioned so as to meet the applicable statutory provisions related to the minimum distance at which an electrical connection (understood as the mating between two terminals) must be located with respect to a body in contact that might potentially generate an amount of heat that is dangerous for the integrity of such connector and of the electrical connection.

[0049] Moreover, the present invention provides a hermetic two-pole or multipole electrical connector that can be manufactured with known systems and technologies.

[0050] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims.

[0051] In practice, the materials used, so long as they are compatible with the specific use, may be any according to requirements and to the state of the art.

[0052] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A hermetic two-pole or multipole electrical connector (10), comprising a central engagement portion (11) for at least two electrical terminals (12, 13) from which a corresponding number of laterally adjacent tubular parts (14, 15), at least one first male tubular part (14) and at least one first female tubular part (15), protrude so as to surround said terminals (12, 13), each one of said tubular parts (14, 15) being designed to mate with a corresponding male or female tubular part (14a, 15a) of an associated similar electrical connection element (10a), a hermetic containment and closure portion (16) extending from said central portion (11), opposite with respect to said tubular parts (14, 15), for segments (17, 18) adapted to crimp said terminals (12, 13) to respective electrical cables (19, 20), said hermetic containment portion (16) being formed by two half-shells (21, 22) designed to close onto each other, at least one of said two half-shells (21, 22) being articulated to said central portion (11) by way of hinge means (23, 24),

said electrical connector (10) also comprising reversible extraction-preventing means for quick coupling to a similar corresponding associated electrical connection element (10a), said electrical connector (10) being **characterized in that** it further comprises a series of spacer ribs (25, 26) designed to ensure a predefined safety distance for a body in contact, and **in that** the hermetic sealing means for said half-shells (21, 22) are provided

- by a first gasket (28, 29), which is overmolded on at least one first half-shell (21, 22) at the regions where said half-shells (21, 22) surround the electrical cables (19, 20) proximate to the crimping portions (17, 18) and at the surfaces of at least one of the two half-shells (21, 22) that are adapted to abut against the corresponding surfaces of the other half-shell in the closed configuration,

- by a second gasket (30), which is overmolded on said central portion (11) and arranged in at least one region between the base of the male tubular part (14) and the head of the female tubular part (15).

2. The electrical connector according to claim 1, **characterized in that** said two half-shells (21, 22) are both hinged to said central portion (11) by means of a bridge-like hinge (23, 24) and provided simultaneously with the monolithic molding of said central portion (11) with said tubular parts (14, 15) and of said half-shells (21, 22) with these last in the open configuration.
3. The electrical connector according to the preceding claims, **characterized in that** it comprises a third gasket (40) that is molded on the central portion (11) around the inlets of engagement seats (41) for the terminals (12, 13).
4. The electrical connector according to the preceding claims, **characterized in that** said two half-shells (21, 22) are retained in a mutually closed condition by snap-acting interlocking means.
5. The connector according to claim 4, **characterized in that** said snap-acting interlocking means are provided by a pair of engagement teeth (31) that protrude laterally and in a mutually opposite arrangement from the second half-shell (22) and are adapted to each enter with a snap action a corresponding opening (32) formed on a shoulder (33) that extends from the corresponding side of the first half-shell (21).
6. The electrical connector according to the preceding claims, **characterized in that** said extraction-preventing means for quick engagement with a similar

corresponding associated electrical connection element (10a) are constituted by a snap-acting engagement tab (34) that protrudes from said central portion (11) and extends in a cantilever fashion laterally with respect to said male tubular portion (14), said tab (34) having, at the end that extends on the side of said tubular parts (14, 15), a first tooth (35) for snap-acting engagement with a corresponding second tooth (36a) formed on an associated connection element and, at the opposite end, a maneuvering tail (37) for the manual disengagement of the tab (34), whose bridge (38) for connection to said central portion (11) is elastically deformable, said quick engagement means also comprising a second tooth (36) that protrudes at the end of said female tubular part (15) available for engagement with the first tooth (35a) of a snap-acting engagement tab (34a) of another associated identical electrical connector (10a).

7. The electrical connector according to the preceding claims, **characterized in that** said central portion (11) is contoured to accommodate cylindrical terminals (12, 13), either of the male type or of the female type or both male and female.

8. The electrical connector according to the preceding claims, **characterized in that** a first electrical connector (10) is designed for quick and reversible engagement with another second identical electrical connector (10a) provided with male and/or female terminals designed for mating with the corresponding female and/or male terminals of the first electrical connector (10).

Patentansprüche

1. Ein hermetisches zweipoliges oder mehrpoliges elektrisches Anschlussstück (10), das einen zentralen Eingriffsabschnitt (11) für mindestens zwei elektrische Klemmen (12, 13) umfasst, aus dem eine entsprechende Anzahl seitlich benachbarter rohrförmiger Teile (14, 15), mindestens ein erstes rohrförmiges Stecker-Teil (14) und mindestens ein erstes rohrförmiges Buchsen-Teil (15), herausragen, so dass sie die Klemmen (12, 13) umgeben, wobei jedes der rohrförmigen Teile (14, 15) konstruiert ist, um mit einem entsprechenden rohrförmigen Stecker- oder Buchsen-Teil (14a, 15a) eines dazugehörigen ähnlichen elektrischen Anschlusselements (10a) zusammenzupassen, wobei sich ein hermetischer Umschließungs- und Verschlussabschnitt (16) von dem zentralen Abschnitt (11), entgegengesetzt in Bezug auf die rohrförmigen Teilen (14, 15) erstreckt, für Segmente (17, 18), die ausgebildet sind, um die Klemmen (12, 13) an jeweilige elektrische Kabel (19, 20) zu crimpen, wobei der hermetische umschließungsabschnitt (16) aus zwei Halbschalen

(21, 22) gebildet, die konstruiert sind, um sich aufeinander zu schließen, wobei mindestens eine der zwei Halbschalen (21, 22) durch Scharniermittel (23, 24) gelenkig mit dem zentralen Abschnitt (11) verbunden ist, wobei das elektrische Anschlussstück (10) auch reversible Extraktions-verhindernde Mittel zur schnellen Kopplung mit einem ähnlichen entsprechenden dazugehörigen elektrischen Anschlusselement (10a) umfasst, wobei das elektrische Anschlussstück (10) **dadurch gekennzeichnet ist, dass** es weiter eine Reihe von Abstandsrillen (25, 26) umfasst, die konstruiert sind, um einen vordefinierten Sicherheitsabstand für einen Körper im Kontakt sicherzustellen, und **dadurch**, dass die hermetischen Abdichtungsmittel für die Halbschalen (21, 22) bereitgestellt werden

- von einer ersten Dichtung (28, 29), die auf mindestens eine erste Halbschale (21, 22) an den Bereichen überspritzt ist, wo die Halbschalen (21, 22) die elektrischen Kabel (19, 20) in der Nähe der Crimp-Abschnitte (17, 18) umgeben, und an den Oberflächen mindestens einer der zwei Halbschalen (21, 22), die ausgebildet sind, um in der geschlossenen Anordnung an die entsprechenden Oberflächen der anderen Halbschale anzustoßen,
- von einer zweiten Dichtung (30), die auf den zentralen Abschnitt (11) überspritzt ist und in mindestens einem Bereich zwischen der Basis des rohrförmigen Stecker-Teils (14) und dem Kopf des rohrförmigen Buchsen-Teils (15) angeordnet ist.

2. Das elektrische Anschlussstück gemäß Anspruch 1, **dadurch gekennzeichnet, dass** die zwei Halbschalen (21, 22) beide durch ein brückenartiges Scharnier (23, 24) an dem zentralen Abschnitt (11) angelenkt sind und gleichzeitig mit dem monolithischen Formen des zentralen Abschnitts (11) mit den rohrförmigen Teilen (14, 15) und den Halbschalen (21, 22) bereitgestellt werden, wobei sich die Letzteren in der offenen Anordnung befinden.
3. Das elektrische Anschlussstück gemäß den obigen Ansprüchen, **dadurch gekennzeichnet, dass** es eine dritte Dichtung (40) umfasst, welche am zentralen Abschnitt (11) um die Einlässe von Eingriffsitzen (41) für die Klemmen (12, 13) herum geformt ist.
4. Das elektrische Anschlussstück gemäß den obigen Ansprüchen, **dadurch gekennzeichnet, dass** die zwei Halbschalen (21, 22) durch Schnappwirkungs-Verbindungsmittel in einem zueinander geschlossenen Zustand gehalten werden.
5. Das Anschlussstück gemäß Anspruch 4, **dadurch**

gekennzeichnet, dass die Schnappwirkungs-Verbindungsmittel von einem Paar von Eingriffszähnen (31) bereitgestellt werden, die seitlich und in einer einander gegenüberliegenden Anordnung aus der zweiten Halbschale (22) herausragen und die ausgebildet sind, um jeweils mit einer Schnappwirkung in eine entsprechende Öffnung (32) einzudringen, die an einer Schulter (33) geformt ist, welche sich von der entsprechenden Seite der ersten Halbschale (21) erstreckt.

6. Das elektrische Anschlussstück gemäß den obigen Ansprüchen, **dadurch gekennzeichnet, dass** die Extraktions-verhindernden Mittel für den schnellen Eingriff mit einem ähnlichen entsprechenden dazugehörigen elektrischen Anschlusselement (10a) aus einer Schnappwirkungs-Eingriffsflasche (34) bestehen, die aus dem zentralen Abschnitt (11) herausragt und sich auf freitragende Art und Weise seitlich in Bezug zu dem rohrförmigen Stecker-Abschnitt (14) erstreckt, wobei die Flasche (34) Folgendes hat: an dem Ende, das sich auf der Seite der rohrförmigen Teile (14, 15) erstreckt, einen ersten Zahn (35) für den Schnappwirkungs-Eingriff mit einem entsprechenden zweiten Zahn (36a), der an einem dazugehörigen Verbindungselement geformt ist; und am gegenüberliegenden Ende ein Manövrier-Endstück (37) zum manuellen Lösen der Flasche (34), deren Brücke (38) für die Verbindung mit dem zentralen Abschnitt (11) elastisch verformbar ist, wobei die Schnelleingriffsmittel ebenfalls einen zweiten Zahn (36) umfassen, der an dem Ende des rohrförmigen Buchsen-Teils (15) herausragt, der für den Eingriff mit dem ersten Zahn (35a) einer Schnappwirkungs-Eingriffsflasche (34a) eines anderen dazugehörigen identischen elektrischen Anschlussstücks (10a) zur Verfügung steht.
7. Das elektrische Anschlussstück gemäß den obigen Ansprüchen, **dadurch gekennzeichnet, dass** der zentrale Abschnitt (11) profiliert ist, um zylindrische Klemmen (12, 13), entweder vom Stecker-Typ oder vom Buchsen-Typ oder sowohl Stecker als auch Buchsen, aufzunehmen.
8. Das elektrische Anschlussstück gemäß den obigen Ansprüchen, **dadurch gekennzeichnet, dass** ein erstes elektrisches Anschlussstück (10) konstruiert ist für die schnelle und reversible Verbindung mit einem anderen zweiten identischen elektrischen Anschlussstück (10a), das mit Steckern und/oder Buchsen ausgestattet ist, welche zur Verbindung mit den entsprechenden Buchsen und/oder Steckern des ersten elektrischen Anschlussstücks (10) vorgesehen sind.

Revendications

1. Connecteur électrique hermétique bipolaire ou multipolaire (10), comprenant une partie centrale d'engagement (11) pour au moins deux bornes électriques (12, 13) à partir desquelles un nombre correspondant de pièces tubulaires latéralement adjacentes (14, 15), au moins une première pièce tubulaire mâle (14) et au moins une première pièce tubulaire femelle (15), font saillie de manière à entourer lesdites bornes (12, 13), chacune desdites pièces tubulaires (14, 15) étant conçue pour s'apparier avec une pièce tubulaire mâle ou femelle correspondant (14a, 15a) d'un élément de connexion électrique similaire associé (10a), une partie de confinement et de fermeture hermétique (16) s'étendant depuis ladite partie centrale (11), à l'opposé par rapport auxdites pièces tubulaires (14, 15), pour des segments (17, 18) adaptées pour servir lesdites bornes (12, 13) à des câbles électriques (19, 20) respectifs, ladite partie de confinement hermétique (16) étant formée par deux demi-coques (21, 22) conçues pour se fermer l'une sur l'autre, au moins une desdites deux demi-coques (21, 22) étant articulée sur ladite partie centrale (11) par des moyens de charnière (23, 24), ledit connecteur électrique (10) comprenant aussi des moyens empêchant une extraction réversible pour un couplage rapide à un élément de connexion électrique similaire associé correspondant (10a), ledit connecteur électrique (10) étant **caractérisé en ce qu'il** comprend en outre une série de nervures d'espacement (25, 26) conçues pour garantir une distance de sécurité prédéfinie pour un corps en contact, et **en ce que** les moyens d'étanchéité hermétiques pour lesdites demi-coques (21, 22) sont fournis
 - par une première garniture (28, 29), qui est surmoulée sur au moins une première demi-coque (21, 22) sur les zones où lesdites demi-coques (21, 22) entourent les câbles électriques (19, 20) à proximité des parties de sertissage (17, 18) et sur les surfaces d'au moins une des deux demi-coques (21, 22) qui sont adaptées pour venir en butée contre les surfaces correspondantes de l'autre demi-coque dans la configuration fermée,
 - par une deuxième garniture (30), qui est surmoulée sur ladite partie centrale (11) et agencée dans au moins une zone entre la base de la pièce tubulaire mâle (14) et la tête de la pièce tubulaire femelle (15).
2. Connecteur électrique selon la revendication 1, **caractérisé en ce que** lesdites deux demi-coques (21, 22) sont toutes les deux articulées sur ladite partie centrale (11) par une charnière analogue à un pont (23, 24) et venues simultanément du moulage monolithique de ladite partie centrale (11) avec lesdites pièces tubulaires (14, 15) et desdites demi-coques (21, 22) avec ces dernières dans la configuration ouverte.
3. Connecteur électrique selon les revendications précédentes, **caractérisé en ce qu'il** comprend une troisième garniture (40) qui est moulée sur la partie centrale (11) autour des entrées de sièges d'engagement (41) pour les bornes (12, 13).
4. Connecteur électrique selon les revendications précédentes, **caractérisé en ce que** lesdites deux demi-coques (21, 22) sont retenues dans un état mutuellement fermé par des moyens de verrouillage mutuel par encliquetage.
5. Connecteur selon la revendication 4, **caractérisé en ce que** lesdits moyens de verrouillage mutuel par encliquetage sont fournis par une paire de dents d'engagement (31) qui font saillie latéralement et dans un agencement mutuellement opposé par rapport à la seconde demi-coque (22) et sont adaptées pour pénétrer chacune par une action d'encliquetage dans une ouverture correspondante (32) formée sur un épaulement (33) qui s'étend à partir du côté correspondant de la première demi-coque (21).
6. Connecteur électrique selon les revendications précédentes, **caractérisé en ce que** lesdits moyens empêchant l'extraction pour un couplage rapide avec un élément de connexion électrique similaire associé correspondant (10a) sont formés par une languette d'engagement par encliquetage (34) qui fait saillie depuis ladite partie centrale (11) et s'étend latéralement en porte-à-faux par rapport à ladite pièce tubulaire mâle (14), ladite languette (34) ayant, à l'extrémité qui s'étend sur le côté desdites pièces tubulaires (14, 15), une première dent (35) pour un engagement par encliquetage avec une seconde dent correspondante (36a) formée sur un élément de connexion associé et, sur l'extrémité opposée, une queue de manoeuvre (37) pour la libération manuelle de la languette (34), dont le pont (38) de connexion à ladite partie centrale (11) est élastiquement déformable, lesdits moyens de couplage rapide comprenant en outre une seconde dent (36) qui fait saillie à l'extrémité de ladite pièce tubulaire femelle (15) disponible pour un engagement avec la première dent (35a) d'une languette d'engagement par encliquetage (34a) d'un autre connecteur électrique identique associé (10a).
7. Connecteur électrique selon les revendications précédentes, **caractérisé en ce que** ladite partie centrale (11) est profilée pour recevoir des bornes cylindriques (12, 13), du type mâle ou du type femelle ou mâle et femelle à la fois.

8. Connecteur électrique selon les revendications précédentes, **caractérisé en ce qu'**un premier connecteur électrique (10) est conçu pour un couplage rapide et réversible avec un autre second connecteur électrique identique (10a) muni de bornes mâles et/ou femelles conçues pour un appariement avec les bornes femelles et/ou mâles correspondantes du premier connecteur électrique (10).

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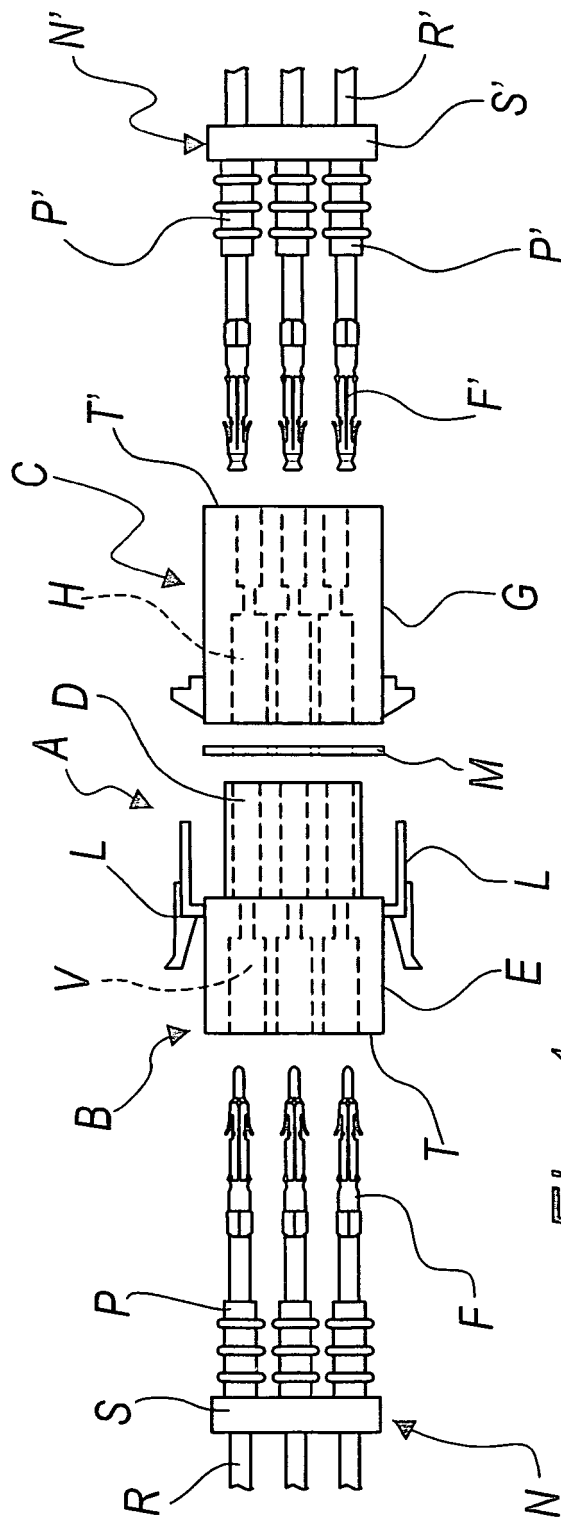
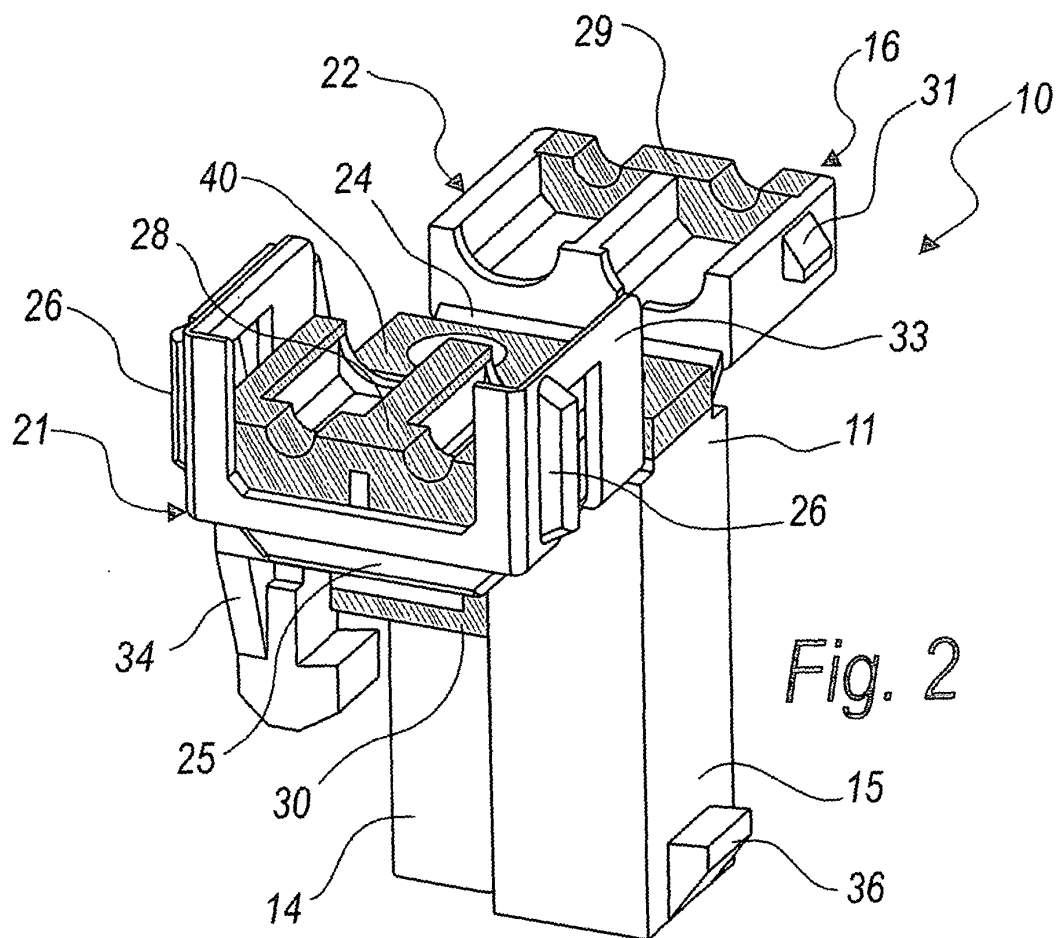
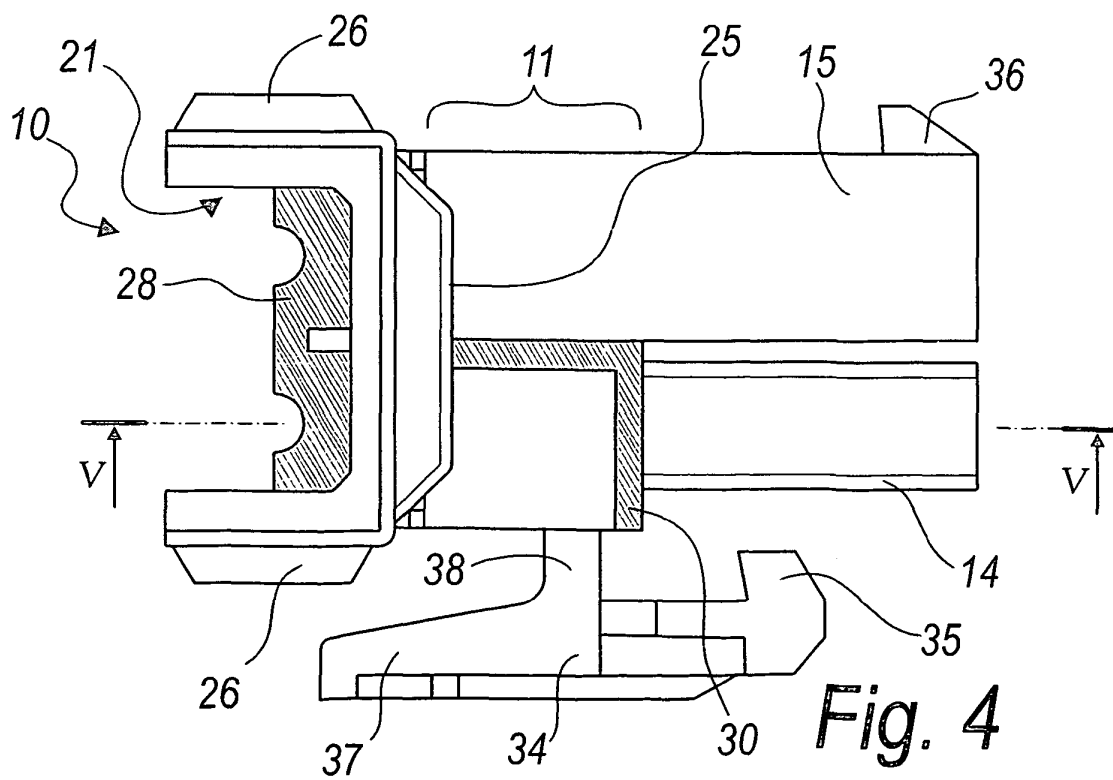
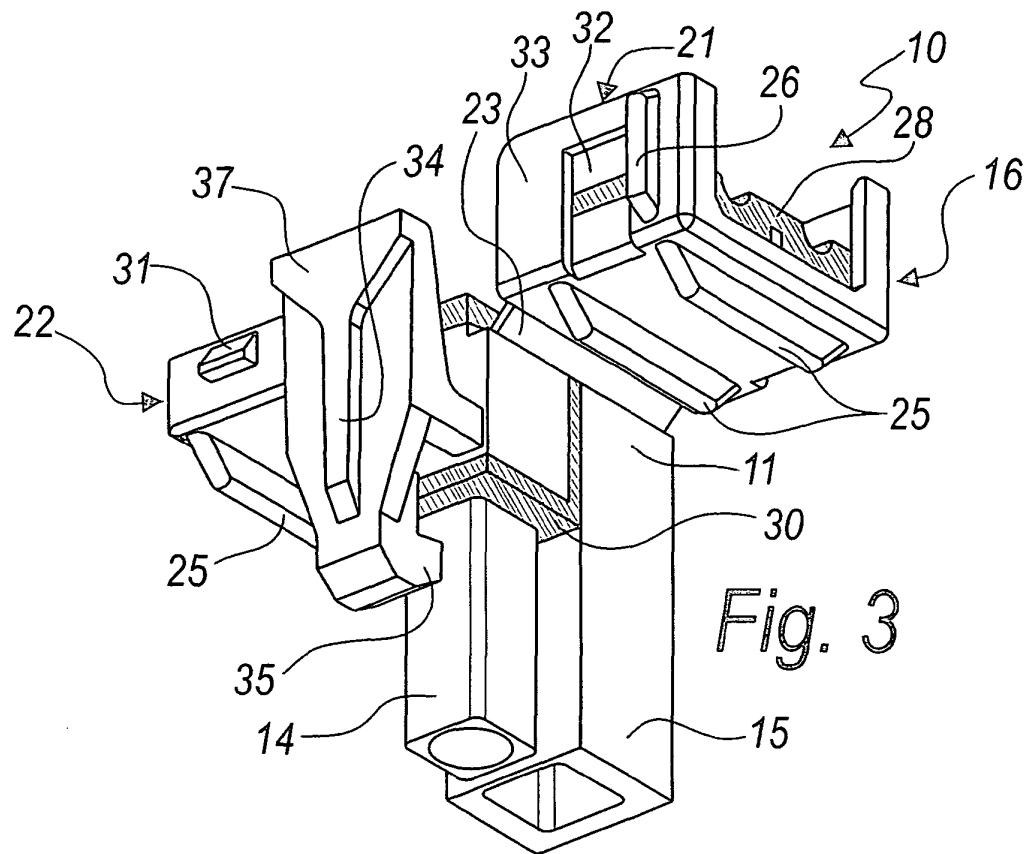
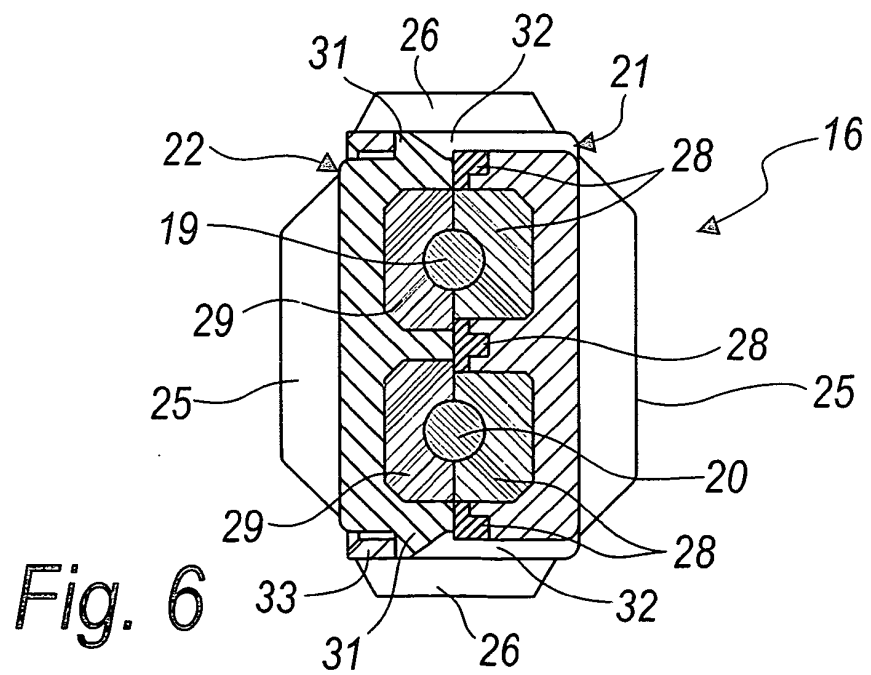
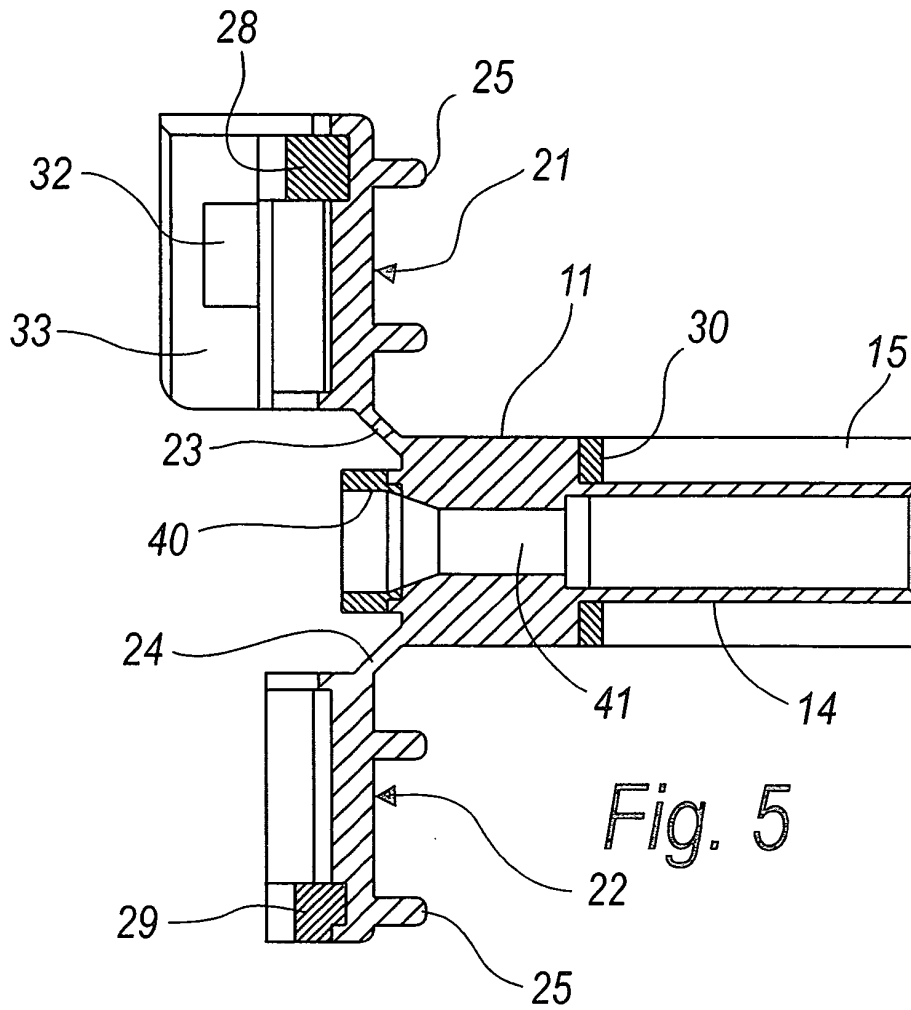
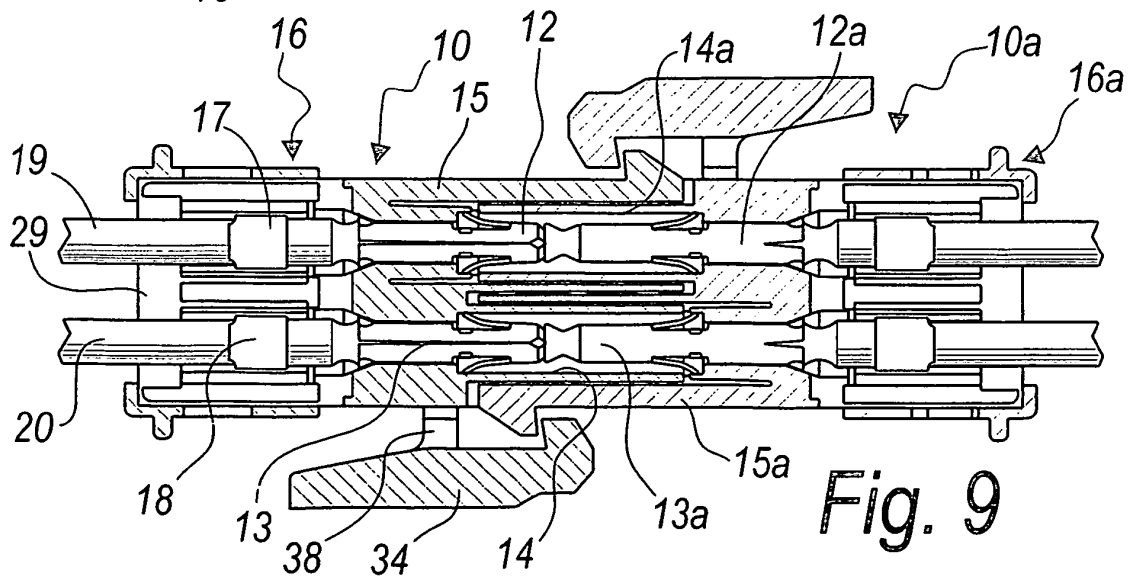
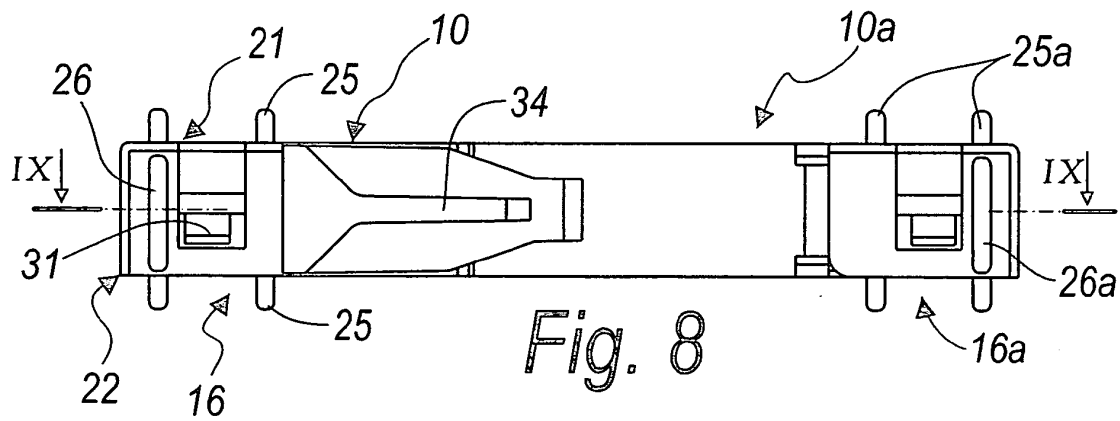
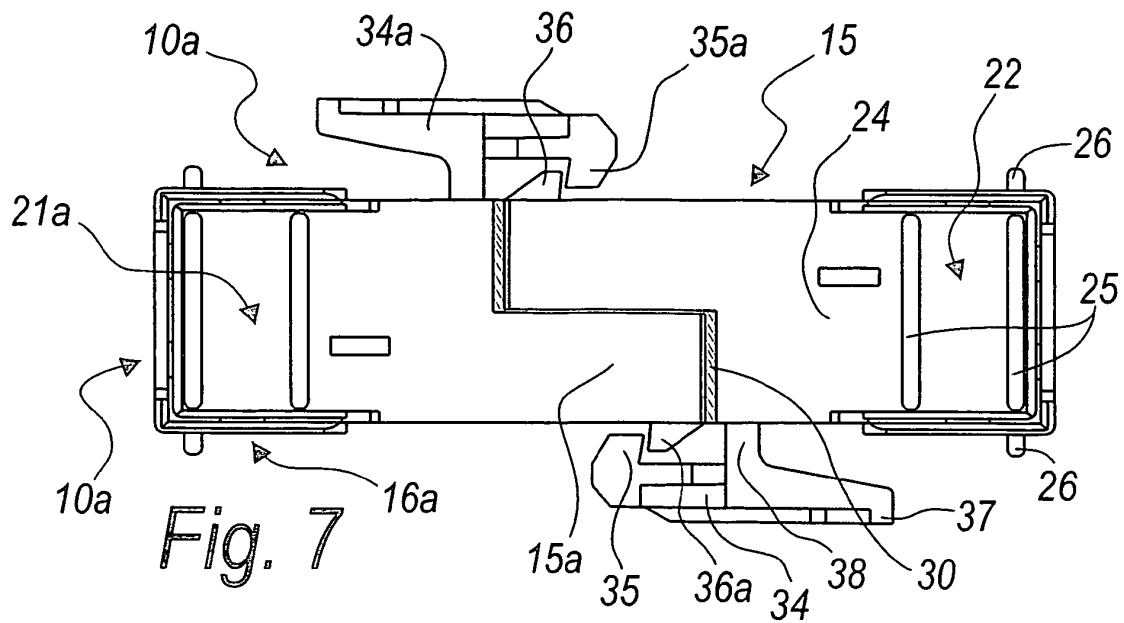


Fig. 1









REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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