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BA ME RS(71) Applicant: **PPC, A Division of John Mezzalingua Associates, Inc.****East Syracuse, NY 13057 (US)**(72) Inventor: **Eriksen, Kim****4760, Vordingborg (DK)**(74) Representative: **Jensen, Peter Kim****Chas. Hude A/S****H.C. Andersens Boulevard 33****1780 Copenhagen V (DK)**(54) **Short post cable connector with resilient clamping member**

(57) A connector (1) for a coaxial cable comprising a body (2) extending from a first body end (4) to a second body end (6) defining a central axis (10). The body (2) has a central bore (9) with an inner surface (26),

- a nut (5) arranged at the second end (6) of the body (2),
- a post (7) arranged in the central bore (9) of the body (2) at the second body end (6) and being adapted to be inserted between the dielectric material (46) and the jacket (42) of a cable (40), and
- a compression member (3) arranged at the first end (4) of the body (2). The connector (1) further comprises an

annular, resilient clamping member (8) arranged within the central bore (9) of the body (2) substantially concentric with the central axis (10), said resilient clamping member (8) comprising:

- a first end (27),
- an opposing second end (28),
- a central aperture defining an inner surface (24), arranged to receive a cable (40) such that the inner surface (24) is in slidable contact with the jacket (42) of the cable (40), and
- an outer surface (25) in slidable contact with the inner surface (26) of the central bore (9).

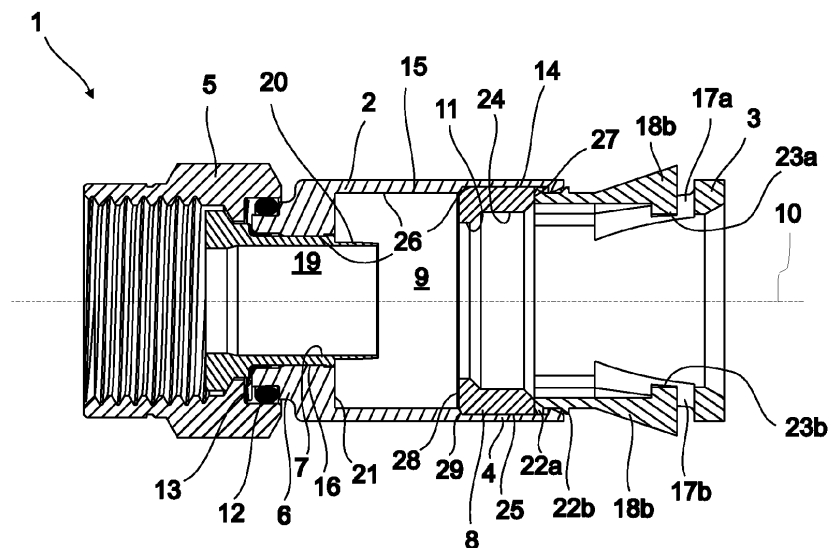


Fig. 1B

Description

[0001] In general, the invention relates to the field of coaxial cable connectors and more specifically to a connector for a coaxial cable comprising:

- a body extending from a first body end to a second body end defining a central axis, the body having a central bore with an inner surface,
- a nut arranged at the second end of the body,
- a post arranged in the central bore of the body at the second body end and being adapted to be inserted between the dielectric material and the jacket of a cable, and
- a compression member arranged at the first end of the body.

[0002] In the field of connectors for TV-cables, data cables and the like, it is important that the connector is firmly and correctly installed in order to ensure that the connection complies with specification. Sometimes, cables, e.g. coaxial cables, use PE material for the jacket of the cable. PE-jackets are more sustainable and less likely to disrupt compared to other widely used and softer materials. However, during installation it is an unfortunate feature that the PE material is hard and difficult to expand. The workers mounting the connector on the cable need to use either special tools and/or very strong effort in order to mount the connector. Often, the workers need to cut the jacket along the longitudinal direction of the cable or heat the jacket in order to be able to mount the connector. By these unauthorised operations, there is a high risk of a poor connection.

[0003] It is an aspect of the present invention to provide a connector that is easy to mount on a cable having a thick and/or stiff jacket, e.g. made of a PE material.

[0004] It is a second aspect of the present invention to provide a connector where no water can penetrate along the jacket of the cable.

[0005] According to the present invention, this aspect is obtained by providing a connector for a coaxial cable comprising

- a body extending from a first body end to a second body end defining a central axis, the body having a central bore with an inner surface,
- a nut arranged at the second end of the body,
- a post arranged in the central bore of the body at the second body end and being adapted to be inserted between the dielectric material and the jacket of a cable, and
- a compression member arranged at the first end of the body. Further, the connector comprises an annular, resilient clamping member arranged within the central bore of the body substantially concentric with the central axis, said resilient clamping member comprising:
 - a first end,

- an opposing second end,
- a central aperture defining an inner surface, arranged to receive a cable, the inner surface being in slidable contact with the jacket of the cable, and
- an outer surface in slidable contact with the inner surface of the central bore.

[0006] The resilient clamping member is arranged such that in a first state it fits tightly around an inserted cable. When the connector is compressed, e.g. by use of the compression member, the resilient clamping member is changed to a second state whereby it clamps harder around the cable. In this way, the connection between the cable and the connector is made watertight, and the cable is kept in a fixed position in the connector. Furthermore, if the cable is a coaxial cable comprising a braid as the outer conductor, the resilient clamping member clamps the braid towards a wall of the body, hence ensuring a firm electrical contact between the braid and the body. When the compression member is activated, typically by moving the compression member along the central axis towards the second body end, the resilient clamping member is also moved towards the second body end. Typically, the cable is prepared in an ordinary manner, i.e. by removing a part of the jacket and folding the braid back partly over the remaining jacket. By moving the resilient clamping member towards the second end, the tight fit between the inner surface of the resilient clamping member and the cable results in the braid, which is folded back, being dragged along with the front of the resilient member.

[0007] In another embodiment of the invention, the resilient clamping member may comprise an annular protrusion extending towards the central axis of the connector body.

[0008] In order to ensure that the connector is tight, e.g. that no signal is lost through the first body end of the connector, it is important to achieve that no wires of the braid is positioned between clamping means and/or compression means. In the present connector, the resilient clamping member functions as clamping means clamping around the jacket of the cable. The annular protrusion of the resilient clamping member results in the braid of the cable being carried easily towards the second end of the connector when the resilient clamping member is pushed towards the second end. In this way, it is achieved that the entire braid is clamped against a wall of the body whereby a firm electrical connection is achieved. The resilient clamping member may be pushed towards the second body end by the compression member. The resilient clamping member may comprise a chamfered rim. In this way, it is made easier to push the prepared cable through the resilient clamping member during mounting of the connector on the cable.

[0009] In another embodiment of the invention, the resilient clamping member may be made of a dielectric elastomeric material.

[0010] In another embodiment of the invention, the

elastomeric material may be silicone or EPDM.

[0011] In another embodiment of the invention, the central bore of the body may comprise a plurality of diameters.

[0012] In another embodiment of the invention, the central bore of the body may comprise:

- a receiving region having a first diameter and
- a clamping region having a second diameter.

[0013] In another embodiment of the invention, the central bore of the body may further comprise a post region having a third diameter.

[0014] The change from a second diameter to a third diameter may be a wall substantially perpendicular to the inner surface of the central bore.

[0015] In another embodiment of the invention, the central bore may comprise a wedge section in the transition from a first diameter to a second diameter.

[0016] In this way, it is achieved that a part, e.g. the resilient clamping member, is kept in a desired position until a certain force is exerted on the resilient clamping member. For instance when inserting a cable, the resilient clamping member should be kept in position until subjected to a force moving it towards the second end of the body. Furthermore, the transition from one diameter to a smaller second diameter results in the resilient clamping member subjecting an inwardly directed force against the cable, i.e. towards the central axis of the body.

[0017] In another embodiment of the invention, the post may extend for a distance under the jacket of an inserted cable that is less than half the distance that the jacket extends within the central bore of the body.

[0018] The post may extend 1 - 30 mm, 2 - 20 mm or 3 - 10 mm under the jacket of a cable. A post having an insertion part of less than 30 mm facilitates that the connector is easy to mount on a cable because a smaller length of the jacket that need to be expanded in order to force the post (the insertion part) between the dielectric material of the cable and the jacket of the cable. The post may extend for a distance under the jacket of an inserted cable, said distance being less than half the distance from the wall delimiting the second diameter from the first diameter to the rim of the first end of the body.

[0019] Due to a wedge section (or a ledge section) delimiting the first diameter from the second diameter of the central bore, the resilient clamping member is kept in position when the cable is inserted in the connector. Hence, having inserted the cable in the connector, the resilient clamping member is kept in the first body end of the connector and thus positioned between the jacket of the cable and the inner surface of the body. When the resilient clamping member is pushed towards the second end of the body, the resilient clamping member is compressed due to the smaller diameter of the central bore.

[0020] In another embodiment of the invention, the compression member may comprise

- a substantially cylindrical compression member having a first compression body end and a second compression body end comprising:
- a slit delimiting a tongue section in the compression member body, said tongue having a substantially wedge-shaped cross section tapering towards the second end of the compression body, where, upon advancing the compression member towards the second end of the body, said tongue section is arranged such as to co-operate with the inner surface of the central bore of the body in order to apply a substantially radially oriented force towards the central axis.

[0021] In this way it is achieved that the compression member is brought into close contact with the cable whereby the cable and the connector body are fixed relative to each other. The tongue section may comprise inwardly projecting gripping means.

[0022] In another embodiment of the invention, the slit may be V-shaped.

[0023] The slit results in a tongue section being hinged in an area opposite the bottom of the V. Hence, the tongue section comprises two free edges. The free edges of the tongue section may form a 90 deg. angle. The free edges of the tongue section may form an acute angle. The free edges of the tongue section may form an obtuse angle. In another embodiment the slit may have the shape of a truncated V, e.g. similar to the cross section of a truncated pyramid.

[0024] In another embodiment of the invention, the slit may be T-shaped.

[0025] In this way it is achieved that two sets of corners are provided to grip the cable.

[0026] In another embodiment of the invention, the tongue section may have the shape of a truncated pyramid. It is to be understood that the shape of the slit may have a generally different shape compared to the shape of the tongue section.

[0027] In another embodiment of the invention, the compression member may comprise an outwardly extending protrusion positioning the compression member in an initial position in the body of the connector before compressing it into the body of the connector along the central axis of the connector.

[0028] The protrusion results in the compression member being positioned in an initial position where the tongue section is in a first state. In said first state the tongues are in a position allowing an easy insertion of the cable.

[0029] The present invention will now be discussed in more details with reference to the drawings in which:

Figs. 1A and 1B show a connector according to the invention,

Fig. 2 shows the connector of Fig. 1 in an exploded view,

Figs. 3A and 3B (3B partly in cross-sectional view) show the connector of Fig. 1 having a cable inserted, the connector being in an uncompressed state,

Figs. 4A and 4B (4B in cross-sectional view) show the connector of Fig. 3 in a semi-compressed state,

Figs. 5A and 5B (5B in cross-sectional view) show the connector of Fig. 4 in a fully compressed state, and

Fig. 6 shows another embodiment of the compression member of the connector of Fig. 1.

Detailed description of the drawings

[0030] Figs. 1A and 1B show a connector 1 comprising a body 2 having a compression member/a compression ring 3 inserted in a first end 4 of the body 2. A nut 5 is mounted on the second body end 6. In Fig. 1B, it is seen that the connector 1 comprises a post 7 inserted in the first end 4 of the body 2. A resilient clamping member 8 is inserted in a central bore 9 defining a central axis 10. In this state, the resilient clamping member 8 is situated in the first end 4 of the body 2. The resilient clamping member 8 comprises an inwardly extending protrusion 11, e.g. a lip. The resilient clamping member 8 comprises an inner surface 24 and an outer surface 25. The outer surface 25 is in slidable contact with the inner bore surface 26 of the central bore 9. The resilient clamping member 8 has a first end 27 and a second end 28. Further, the connector 1 comprises an O-ring 12 and an electrically conductive spring 13. In this embodiment, the central bore 9 of the body 2 has a first diameter defining a receiving region 14, a second diameter defining a clamping region 15, and a third diameter defining a post region 16. The change in diameter from the receiving region 14 to the clamping region 15 comprises an annular chamfered ledge (a wedge section) 29. The compression member 3 comprises slits 17a and 17b and wedge-shaped tongue sections 18a and 18b. The wedge-shaped tongue sections 18a and 18b may be truncated pyramids. Further, the compression member 3 comprises annular, outwardly extending protrusions 22a and 22b cooperating with the rim of the body 2 in order to position the compression member 3 in a first state before it is compressed into the body 2. In this embodiment, the wedge-shaped tongue sections 18a and 18b comprise inwardly protruding gripping sections 23a and 23b. In this embodiment, the post 7 is mounted in the body 2 by a press fit. The post 7 comprises a central post bore 19 and an insertion part 20 of the post extending into the clamping region 15 of the central bore 9 of the body 2. The change in diameter from the clamping region 15 and the post region 16 is delimited by an internal body wall 21.

[0031] Fig. 2 shows the connector 1 of Fig. 1 in an exploded view in which the parts are more visible. It is seen that connector 1 comprises a post 7, a nut 5, an

electrically conductive spring 13, an O-ring 12, a body 2, a resilient clamping member 8 and a compression member 3. The resilient clamping member 8 comprises an inwardly extending protrusion 11, e.g. a lip, a first end 27 and a second end 28. Furthermore, the resilient clamping member 8 comprises an inner surface 24 and an outer surface 25. The compression member 3 comprises a wedge-shaped tongue section 18. It is seen that the diameter of the inner bore of the compression member 3 is larger when measured in a cross section cutting through the wedge-shaped tongues 18. This is due to the fact that during the manufacturing of this embodiment of the compression member 3, the gripping section 23 (only partly visible) is formed directly in the moulding process and this process implies the use of a kernel tool during the moulding process whereby the gripping section is formed.

[0032] Figs. 3A and 3B show the connector 1 having a prepared cable 40 inserted. The connector is shown still in its uncompressed state. The cable is prepared having a part of the jacket 42 removed, and the exposed braid 44 is folded back. The braid 44, i.e. the outer conductor/screen, may be a combination of braid and foil or other materials, but in the following only named "braid". It is seen that the braid 44, which is folded back, is kept in the clamping area 15, and nothing of the braid is situated between the jacket 44 and the resilient clamping member 8. The part of the prepared cable 40 that is exposed, i.e. where the jacket is removed, is inserted in the central bore 19 of the post 7. The insertion part 20 of the post 7 is inserted between the dielectric material 46 and the jacket 42. The cable 40 is shown having a relatively thick jacket 42 compared to the diameter of the dielectric material 46. Having a short insertion part 20 is particularly advantageous when the jacket 42 is thick, typically e.g. a PE jacket. A short insertion part 20 results in less jacket material being forced away in order to facilitate inserting the insertion part 20 of the post 7 under the jacket 42. It is seen that the lip 11 of the resilient clamping member 8 is in contact with the jacket 42 of the cable 40 and that the resilient clamping member 8 is positioned in the receiving part 14 of the central bore 9 of the body. Furthermore, it is seen that the gripping section 23 of the wedge-shaped tongue section 18 is not yet gripping the jacket 40.

[0033] Figs. 4A and 4B show that the compression member 3 is pushed partly into the body 2, i.e. that the compression member 3 is moved towards the second end 6 of the body 2 following the direction of arrow A1. Pushing the compression member 3 in the direction of the second end 6 of the body 2 results in the compression member 3 pushing on the second end 27 of the resilient clamping member 8, which is then pushed towards the second end 6 of the body 2. The effect of changing to a smaller diameter from the receiving region 14 to the clamping region 15 is that the lip 11 as well as the rest of the resilient clamping member 8 of the resilient clamping member 8 is compressed. This compression provides that the resilient clamping member 8 clamps harder

around the jacket 42. When moving the resilient clamping member 8 along the central axis 10 of the body 2, the first end 28 of the resilient clamping member 8 draws all individual wires of the braid 44 along with it. In this way, it is achieved that no wires of the braid 44 is left between the resilient clamping member 8 and the jacket 42, which could lead to a connection with signal loss. The compression of the resilient clamping member 8 also has the effect that the connection is tight and thereby avoiding that moist, dirt and water penetrate the connector from the surroundings.

[0034] Figs. 5A and 5B show that the compression member 3 is fully received in the body 2. The compression member 3 has pushed the resilient clamping member 8 into the clamping region 15 whereby the resilient clamping member 8 is fully at its clamping state. In this state, the resilient clamping member 8 clamps around the cable 40 in the region of the cable where the insertion part 20 is inserted under the jacket 42. The resilient clamping member 8 has drawn all wires of the braid 44 against the wall 21 of the body 2. In this way, it is achieved that the connection is watertight and that no signal is lost at the contact between the post and the braid 44. The compression member 3 has pushed the resilient clamping member 8 by pushing on the first end 27 of the resilient clamping member 8. However, the contact between the compression member 3 and the first end 27 of the resilient clamping member 8 may be carried out in various ways, which are within the scope of the present invention.

[0035] The wedge-shaped tongue sections 18a, 18b are fully inserted in the receiving section 14 of the central bore 9 of the body 2. Due to the co-operation between the inner surface of the central bore 9 in the receiving section 14 and the wedge-shaped tongue sections 18a, 18b, the inwardly projecting gripping means 23a, 23b are compressed into the jacket 42 of the cable. This way, the cable is fixated in the connector 1. Hence, the compression member 3 and the gripping means 23a, 23b prevent the cable 40 from being drawn out of the connector during normal use and installation.

[0036] Figs. 6A-C show another embodiment of the compression member 3'. In this embodiment, the slit in the substantially cylindrical wall is substantially T-shaped. Each T-shaped slit 17a', 17b' provides two wedge-shaped tongue sections 18a', 18b', 18a'', 18b''. Similarly to the embodiment of the compression member having a V-shaped slit, the tongue sections in this embodiment co-operate with the inner surface of the body 2. In this way, upon forcing the compression member 3' (compression ring) into the body, the tongue sections 18a', 18b', 18a'', 18b'' are forced radially inwardly into the jacket of the cable (not shown in Fig. 6). The tongue sections 18a', 18b', 18a'', 18b'' comprise gripping regions 23a', 23b', 23a'', 23b'' providing a firm grip between the compression member 3' and the cable 40 (not shown).

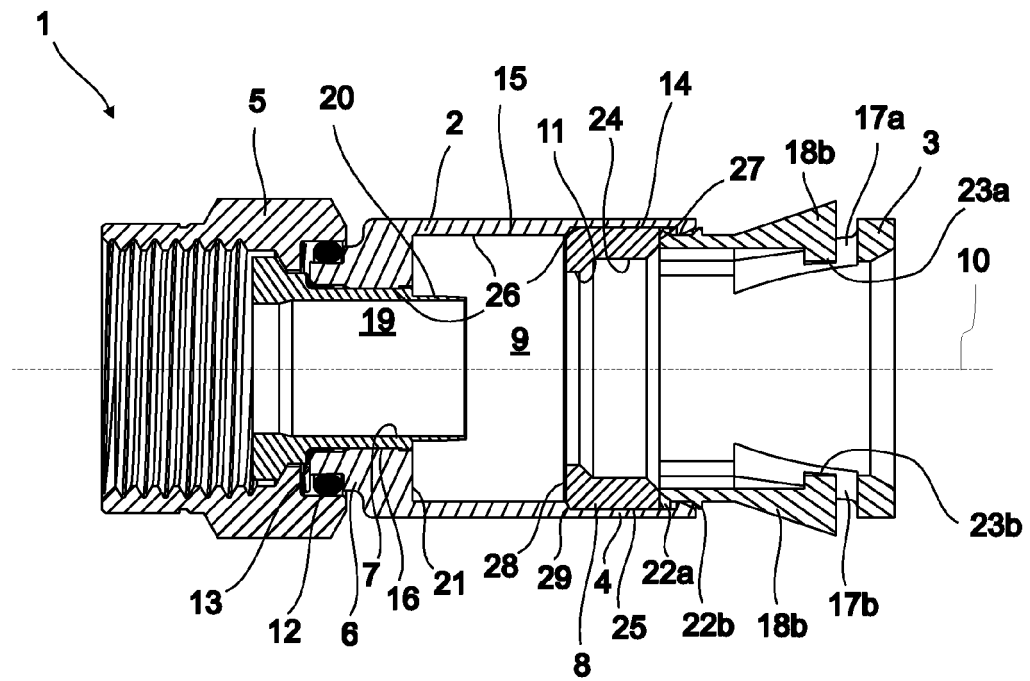
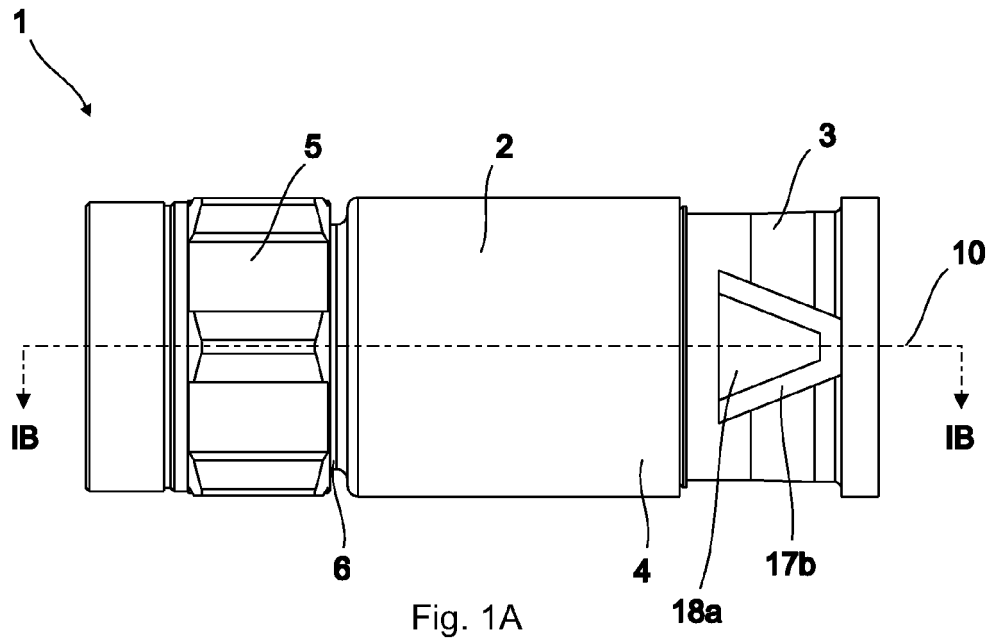
[0037] While specific embodiments of the invention have been described in detail, it will be appreciated by those skilled in the art that various modifications and al-

ternatives to the details disclosed herein could be developed, while the particular arrangements disclosed are meant to be illustrative only and not as limiting the scope of the invention, which is defined in the appending claims and equivalence thereof.

Claims

1. A connector (1) for a coaxial cable comprising
 - a body (2) extending from a first body end (4) to a second body end (6) defining a central axis (10), the body (2) having a central bore (9) with an inner surface (26),
 - a nut (5) arranged at the second end (6) of the body,
 - a post (7) arranged in the central bore (9) of the body (2) at the second body end (6) and being adapted to be inserted between the dielectric material (46) and the jacket (42) of a cable (40), and
 - a compression member (3) arranged at the first end (4) of the body (2), **characterised in that** the connector (1) further comprises an annular, resilient clamping member (8) arranged within the central bore (9) of the body (2) substantially concentric with the central axis (10), said resilient clamping member (8) comprising:
 - a first end (27),
 - an opposing second end (28),
 - a central aperture defining an inner surface (24), arranged to receive a cable (40) such that the inner surface (24) is in slidable contact with the jacket (42) of the cable (40), and
 - an outer surface (25) in slidable contact with the inner surface (26) of the central bore (9).
2. A connector (1) according to claim 1, wherein the resilient clamping member (8) comprises an annular protrusion (11) extending towards the central axis (10) of the connector body (2).
3. A connector (1) according to any of the preceding claims, wherein the resilient clamping member (8) is made of a dielectric elastomeric material (46).
4. A connector (1) according to claim 3, wherein the elastomeric material (46) is silicone or EPDM.
5. A connector (1) according to any of the preceding claims, wherein the central bore (9) of the body (2) comprises a plurality of diameters.
6. A connector (1) according to any of the preceding claims, wherein the central bore (9) of the body (2) comprises:

- a receiving region (14) having a first diameter and
 - a clamping region (15) having a second diameter.
- 5
7. A connector (1) according to claim 6, wherein the central bore (9) of the body (2) further comprises a post region (16) having a third diameter.
8. A connector (1) according to claim 6, wherein the central bore (9) comprises a wedge section in the transition from a first diameter to a second diameter. 10
9. A connector (1) according to any of the previous claims, wherein the post (7) extends for a distance under the jacket (42) of an inserted cable (40) that is less than half the distance that the jacket (42) extends within the central bore (9) of the body (2). 15
10. A connector (1) according to any of the preceding claims, wherein the compression member (3) comprises 20
- a substantially cylindrical compression member (3) having a first compression body end (4) and a second compression body end (5) comprising: 25
 - a slit (17a, 17b) delimiting a tongue section (18a', 18b', 18a'', 18b'') in the compression member body (2), said tongue (18a', 18b', 18a'', 18b'') having a substantially wedge-shaped cross section tapering towards the second end (6) of the compression body (2), where, upon advancing the compression member (3) towards the second end (6) of the body (2), said tongue section (18a', 18b', 18a'', 18b'') is arranged such as to co-operate with the inner surface (26) of the central bore (9) of the body (2) in order to apply a substantially radially oriented force towards the central axis (10). 30
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11. A connector (1) according to claim 10, wherein the slit (17a, 17b) is V-shaped.
12. A connector (1) according to claim 10, wherein the slit (17a, 17b) is T-shaped. 45
13. A connector (1) according to any of the claims 10 - 12, wherein the tongue section (18a', 18b', 18a'', 18b'') has the shape of a truncated pyramid. 50
14. A connector (1) according to any of the claims 10 - 13, wherein the compression member (3) comprises an outwardly extending protrusion (22) positioning the compression member (3) in an initial position in the body (2) of the connector (1) before compressing it into the body (2) of the connector (1) along the central axis (10) of the connector. 55



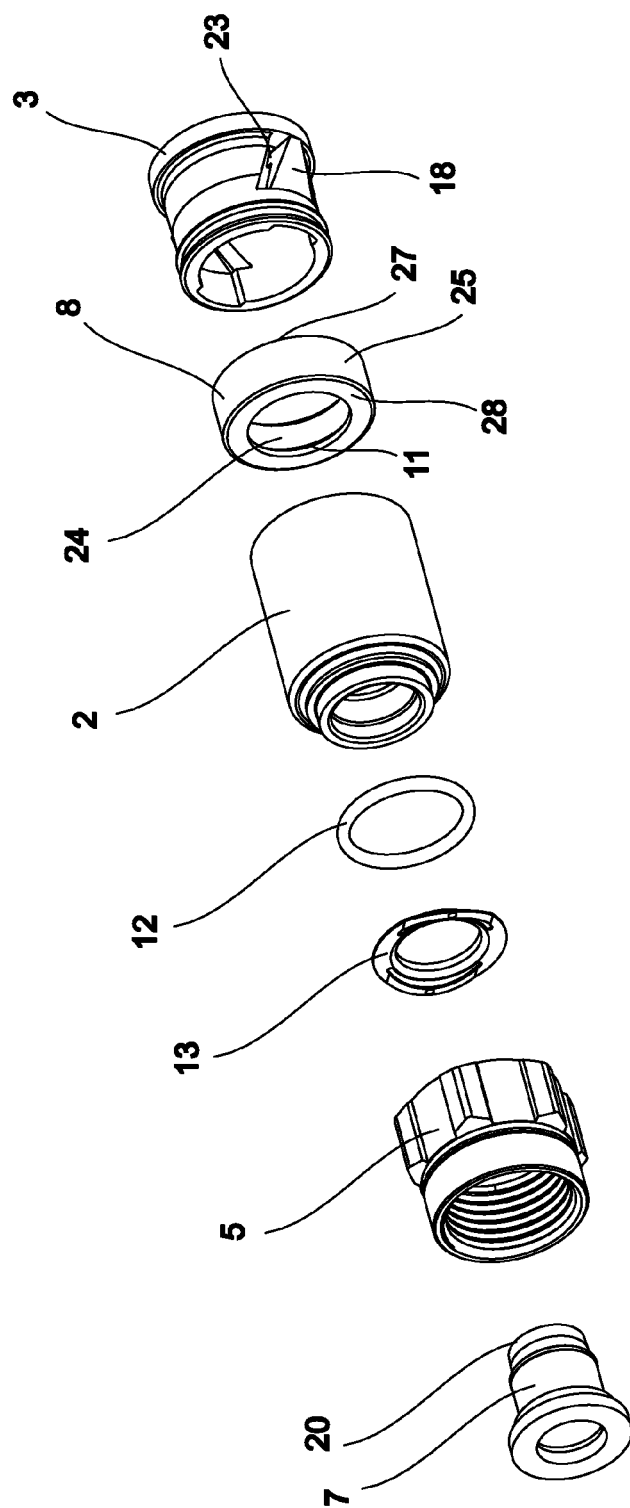


Fig. 2

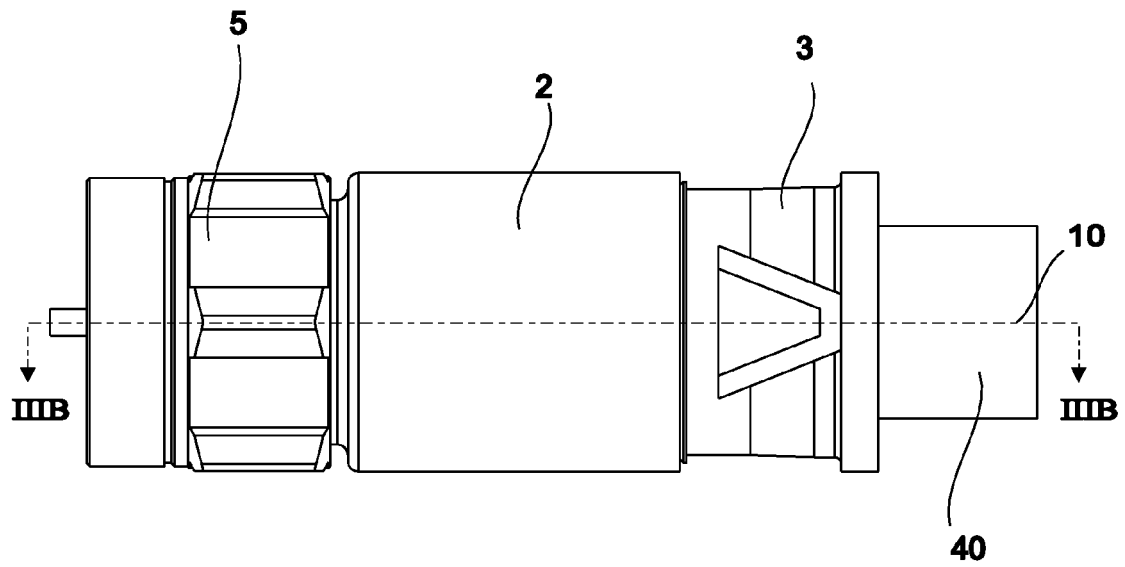


Fig. 3A

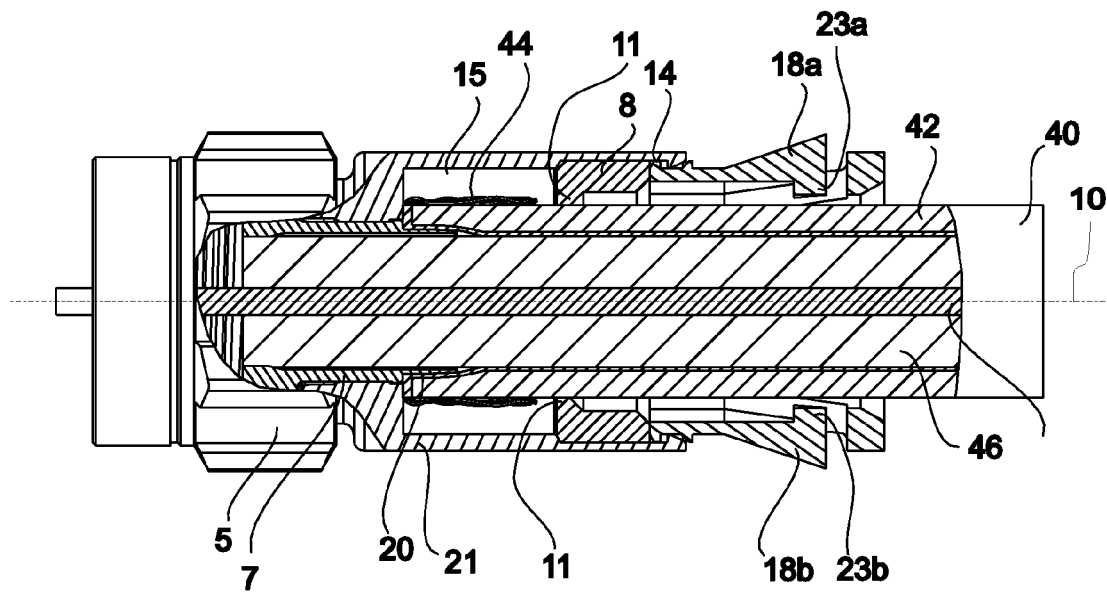


Fig. 3B

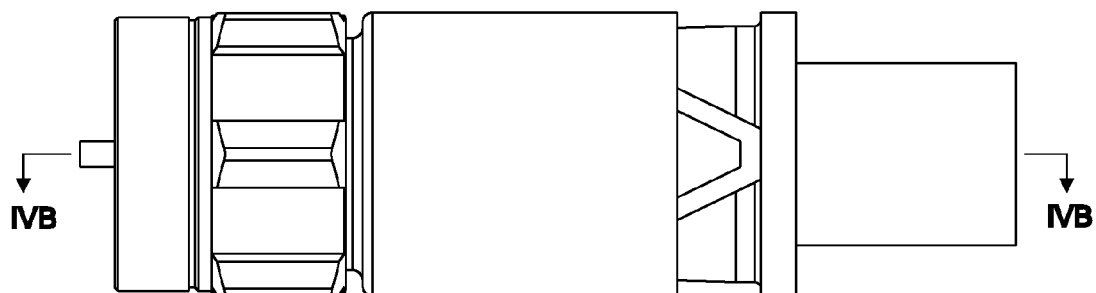


Fig. 4A

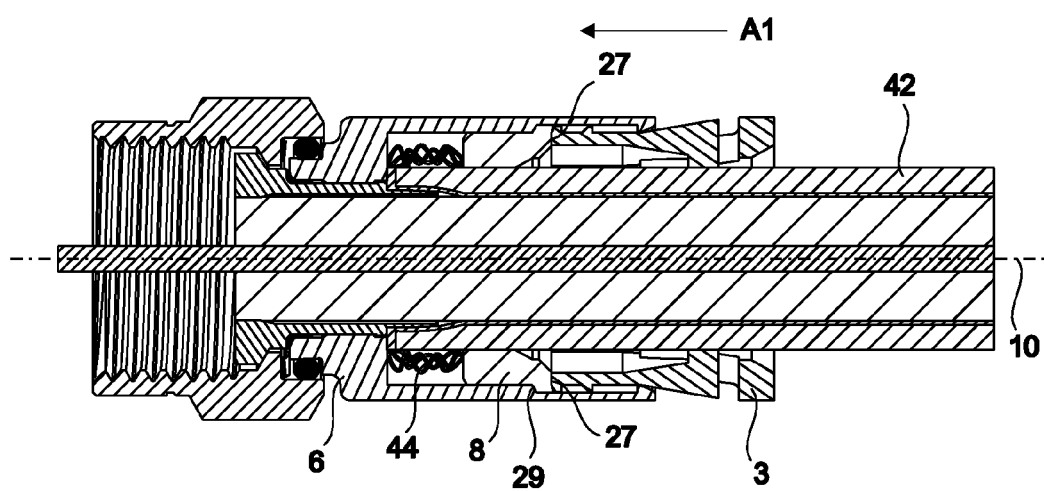


Fig. 4B

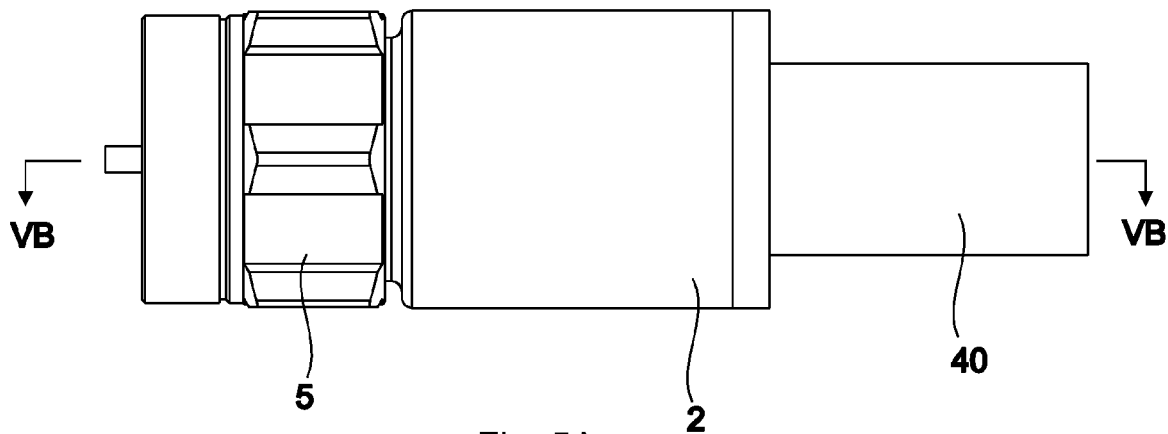


Fig. 5A

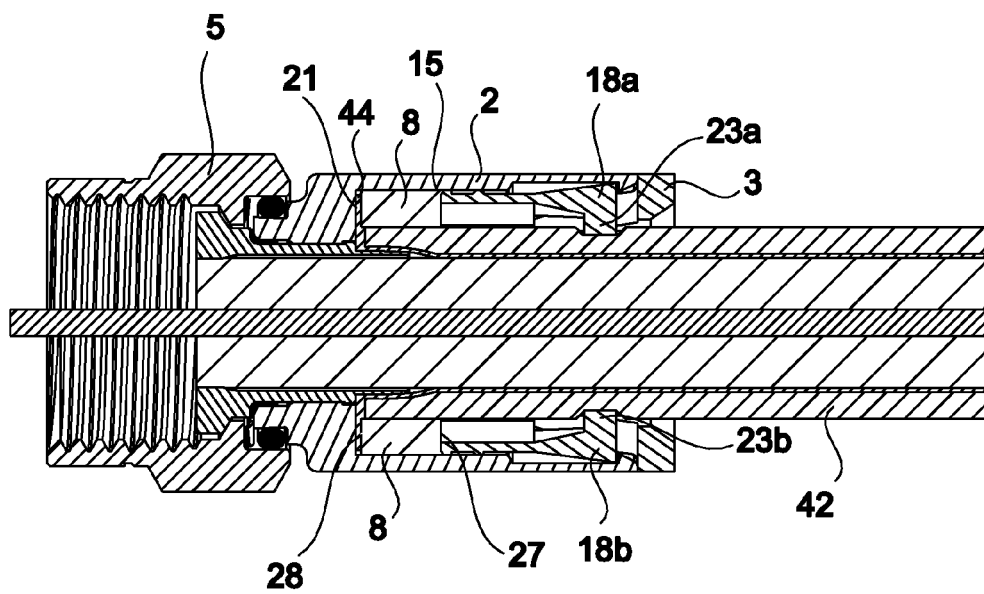
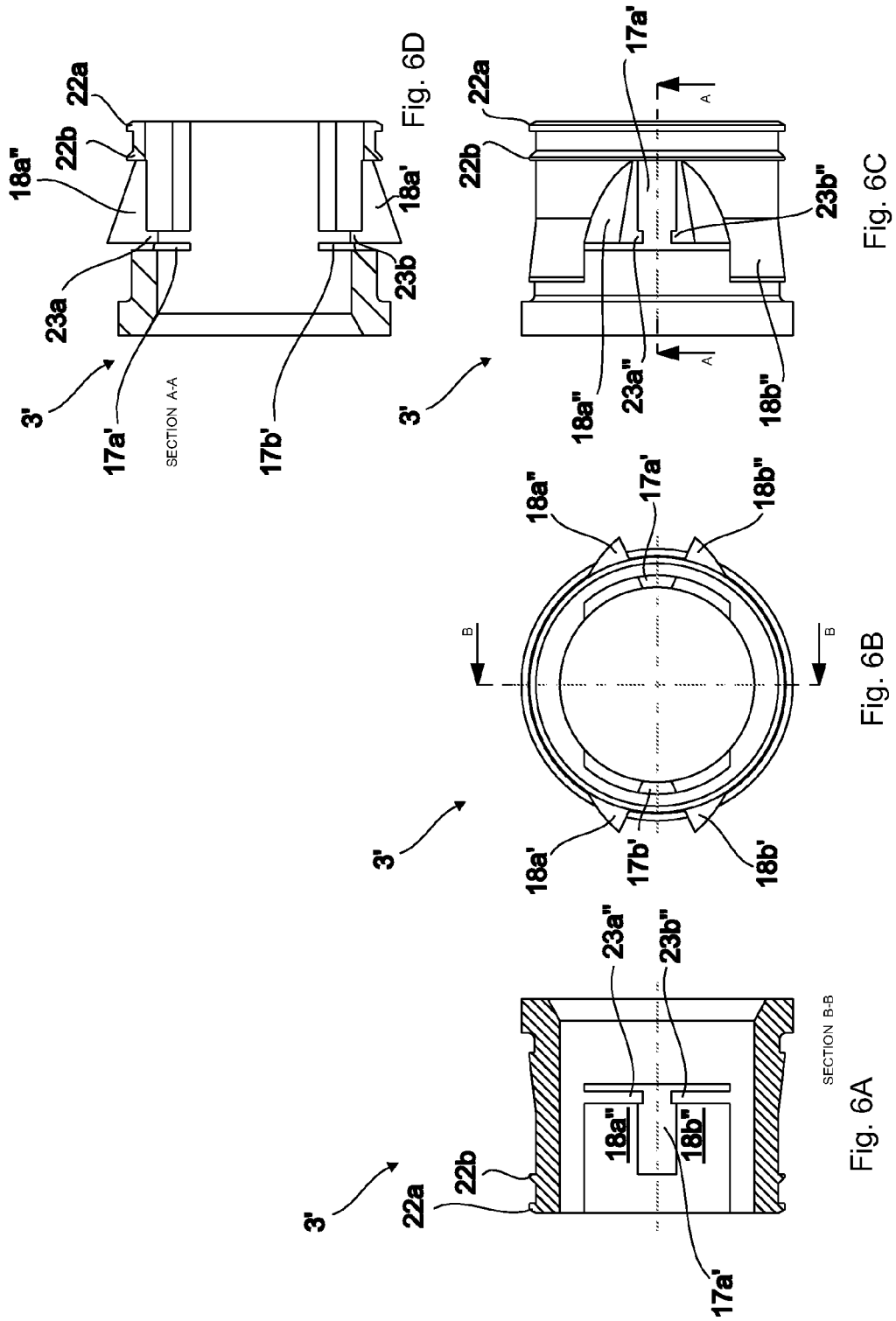


Fig. 5B





EUROPEAN SEARCH REPORT

Application Number
EP 10 16 4953

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2006/292926 A1 (CHEE ALEXANDER B [US] ET AL) 28 December 2006 (2006-12-28) * paragraphs [0002], [0027] * * paragraphs [0031] - [0037]; figures 4-6 *	1,2,5,7-9	INV. H01R9/05
X	US 2008/261445 A1 (MALLOY ALLEN L [US] ET AL) 23 October 2008 (2008-10-23) * paragraphs [0008], [0011] * * paragraphs [0025] - [0026], [0031], [0034], [0036], [0048], [0049]; figures 1-4 *	1,2,5-7,9	
X	FR 2 462 798 A1 (CABLES DE LYON GEOFFROY DELORE [FR]) 13 February 1981 (1981-02-13) * page 1, line 35 - page 2, line 24; figures 1,2 *	1,3-5,8	
X	US 2008/274644 A1 (RODRIGUES JULIO FILIPE [US]) 6 November 2008 (2008-11-06) * paragraphs [0004], [0010], [0011] * * paragraphs [0050] - [0055], [0059] - [0060]; figures 3,4,5 *	1,5-8	
A	US 2007/155232 A1 (BURRIS DONALD ANDREW [US] ET AL) 5 July 2007 (2007-07-05) * paragraphs [0043], [0070]; figures 10-14 *	10	TECHNICAL FIELDS SEARCHED (IPC) H01R
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 4 November 2010	Examiner Tille, Daniel
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 10 16 4953

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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04-11-2010

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2006292926 A1	28-12-2006	US 2008318472 A1	25-12-2008
		US 2009291589 A1	26-11-2009
		US 2008020635 A1	24-01-2008

US 2008261445 A1	23-10-2008	AR 067303 A1	07-10-2009
		BR PI0801199 A2	02-12-2008
		CA 2628726 A1	17-10-2008
		GB 2448595 A	22-10-2008

FR 2462798 A1	13-02-1981	NONE	

US 2008274644 A1	06-11-2008	CA 2628652 A1	01-11-2008

US 2007155232 A1	05-07-2007	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82