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(71) Applicant: **CPE ITALIA S.P.A.**
20157 Milano (IT)

(72) Inventor: **Ciampichetti, Alberto**
20157 Milano (IT)

(74) Representative: **Cicogna, Franco**
Ufficio Internazionale Brevetti
Dott.Prof. Franco Cicogna
Via Visconti di Modrone, 14/A
20122 Milano (IT)

(54) A RF 7/16 coaxial connector and component parts therefor

(57) A RF 7/16 connector comprises two preassembled portions (6, 11) of an insulating material, providing an impedance value of 50 ohms, without increasing the basic size of the connector.

With respect to prior coaxial connectors, the inventive connector allows to compensate for the insulation material dielectric constant, which is greater than that of air, without the requirement of correspondingly increasing the basic size of the connector.

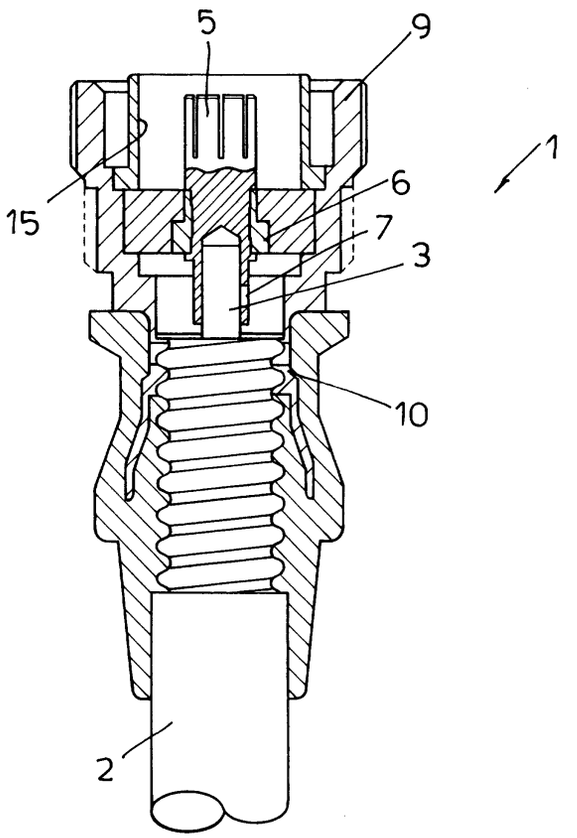

FIG 1

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Description

BACKGROUND OF THE INVENTION

[0001] The present invention relates to a novel RF 7/16 coaxial connector, and the male and female component parts of this connector.

[0002] More specifically, the field of the invention is that of the connectors used for coupling RF coaxial cables, including a ground and a central conductor.

[0003] The above mentioned connectors are provided with a male part and a female part, which can be mutually coupled to provide the junction.

[0004] For this type of device, the DIN 47233 and CECC 22190 standards require that the inside impedance of the connector be of 50 ohms.

[0005] This impedance value is obtained by providing, on the air side of the male and female parts of the connector, a diameter of 7 mm to the central contact (coupled to the central conduct of the coaxial cable), and a diameter of 16 mm to the shield (coupled to the ground of said cable).

[0006] The spacing between the central contact and the shield must be increased at the connector portion occupied by the insulating separating the two poles, because of the dielectric constant of the insulating material which is greater than that of air.

[0007] In order not to modify the size values of the connector, mainly at the level of the portion occupied by the insulating material, one prior art solution proposes to reduce the diameters of the central contact and shield (for example to 6 mm and 13.5 mm respectively), so as to preserve the size ratio suitable to provide an impedance of 50 ohms.

[0008] The above mentioned approach, however, does not meet the above mentioned standards, which require a construction 7/16 for RF coaxial connectors.

SUMMARY OF THE INVENTION

[0009] Accordingly, the main object of the present invention is to provide such a coaxial connector of the above mentioned type which, while including a central contact of 7 mm and a shield of 10 mm, allows to provide the desired impedance value even at a level of the insulating material, without the need of modifying the main size of the connector.

[0010] According to one aspect of the present invention, the above mentioned object, as well as yet other objects, which will become more apparent hereinafter, are achieved by the coaxial connector and female and male parts therefor according to Claims 1, 8 and 9 respectively.

[0011] Further characteristics of the connector according to the present invention are defined by the remaining claims.

[0012] In particular, owing to the construction made of two separated portions which can be mutually coupled to one another of said insulating material, it is possible to house the central contact, preliminarily coupled to the coaxial cable, through and inside its seat in said insulating material, the seat having a diameter smaller than that (7 mm) of the central contact portion to the air.

[0013] Thus, it is possible to compensate for the larger dielectric constant of the insulating material, while increasing the size of the latter with respect to the air space of the connector, without the requirement of correspondingly increasing the basic size of said connector.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] The above mentioned and yet other objects, features and advantages of the invention will become more apparent hereinafter from the following disclosure of a preferred embodiment of the inventive connector which is illustrated, by way of a non limitative example, in the figures of the accompanying drawings.

[0015] In the drawings:

Figure 1 shows the female part of the connector according to the present invention assembled on the coaxial cable;

Figure 2 shows the central contact of the connector of Figure 1, pre-assembled with an insulating portion and coupled to the coaxial cable;

Figure 3 shows an assembling step for assembling the central contact shown in figure 2 to the body of the connector shown in figure 1;

Figure 4 shows the male part of the connector according to the present invention assembled on the coaxial cable;

Figure 5 shows the central contact of the connector of figure 4, as preassembled with an insulating material portion and coupled to the mentioned coaxial cable; and

Figure 6 shows an assembling step or operation for assembling the central contact of figure 5 to the body of the connector shown in figure 4.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0016] The connector according to the present invention comprises a female part shown in figures 1 to 3, and a male part shown in figures 4 to 6, which male and female parts are coupled to provide a junction of the coaxial cables.

[0017] More specifically, the female part of the connector is indicated by the reference number 1 in figure 1, and it comprises a body 9 for gripping and coupling the male part.

[0018] Inside the above mentioned body 9, are housed the central contact 5 of the connector and the portions 6 and 11 of the insulating material separating the two poles of the coaxial cable 2.

[0019] As shown in a more detailed manner in figure 2, the central contact 5 of the connector is preliminarily soldered at 7 to the central conductor 3 of the coaxial cable 2, said coaxial cable 2 including its ground part 4 and a threaded part 8.

[0020] According to the invention and as is clearly shown in figure 3, the central contact 5 has an air part 18 having a diameter D1 of 7 mm, and a further part 14 engaging on the insulating material, and having a diameter D3 less than D1.

[0021] At the mentioned smaller diameter part 14, the central contact 5 bears, preassembled thereon, a first insulating material portion 6, preferably polyetrafluoroethyylene (PTFE) or polyethylene (PE) (figures 2 and 3.).

[0022] In turn, the body 9 of the connector female part bears preassembled and fixed in its inside a second insulating material portion 11, made of the same material as the portion 6 and adapted to define a seat 12 for receiving and holding therein the first insulating portion 6.

[0023] As shown in figure 3, the assembling of the female part 1 of the inventive connector is made by engaging the central contact 5 shown in figure 2, with the coaxial cable 2 and first insulating portion 6 preassembled thereon, through the housing or seat 12 in the second insulating material portion 11.

[0024] This insertion is carried out so as to bring the part 18 of the central contact 5 to project into the air portion of the connector and to bring the part 14, including the first insulating portion 6, to be locked inside said housing or seat 12 in the second insulating material portion 11.

[0025] Advantageously, the coupling between the two insulating material parts 6 and 11 is of a bayonet type, the housing 12 having a tapering or stepped cross-section 17, corresponding to that 16 of the insulating material portion 6 thereby allowing the latter to be easily engaged in that same housing 12.

[0026] The locking at the desired position of the cable 2 is performed by engaging said cable with the threaded portion 8 of the connector body 9, and by a following soldering 10.

[0027] For meeting the above indicated standard, at the air part of the connector, then diameter D1 of the part 18 of the central contact 5 is of 7 mm, whereas the diameter D2 of the shield 15 is of 16 mm.

[0028] Thus, is assured the intended value of 50 ohms od the impedance at the air portion of the connector.

[0029] To provide that same impedance value even on the insulating material side, depending on the dielectric constant of the latter, without increasing the size of the connector with respect to those imposed by the mentioned standard for the interexchangeability thereof, the diameter of the part 14 of the central contact 5, on the insulating material side, has been brought to a value D3, less than the above mentioned D1 value. Finally, the construction of the insulating material into two portions 6 and 11, the first of which has been preassembled on the body of the central connector, allows to apply the central contact 5, already coupled to the cable 2, inside the connector body 9, through a housing 12 which is generally smaller than the air part 18 of said contact 5.

[0030] The preceding disclosure of the female part 1 of the inventive connector can be likewise repeated for the male part 13 shown in figures 4 to 6.

[0031] The invention, as disclosed and illustrated, is susceptible to several modifications and variations, all of which will come within the scope of the accompanying claims.

Claims

1. A RF coaxial connector, of the type comprising a connector female part and a connector male part both said connector parts being provided, on an air side, with a central contact (5) having a diameter (D1) of 7 mm, and a shield (15) having a diameter (D2) of 16 mm, to provide an impedance value of 50 ohms on the air part of the connector, **characterized in that** said connector comprises means for providing the same impedance value even at a level of an insulating material separating the two poles of the connector, without increasing a basic size of said connector.

2. A connector according to Claim 1, **characterized in that** said means comprise a first (6) and a second (11) insulating material portion, said insulating material portions being separated from one another and adapted to be coupled as the connector is wired.

3. A connector according to Claim 2, **characterized in that** said insulating material first and second portions are preassembled, respectively, on the central contact (5) and on the body (9) of said connector male and female parts.

4. A connector according to Claim 3, **characterized in that** said central contact (5) is provided with an air part (18) having a diameter (D1) of 7 mm and an insulating material engaged part (14) having a diameter (D3) less than (D1), and that said central contact (5) is preassembled to said coaxial cable (2) and has the first insulating material portion (6) preassembled on the reduced diameter part (14).

5. A connector according to one or more of the preceding claims, **characterized in that** said second insulating material portion (11) defines an inner housing (12) for housing therein said first insulating portion material (6) having a configuration mating that of said inner housing (12).

6. A connector according to Claim 5, **characterized**

in that the configuration of said first insulating portion (6) and of said housing (12) is a stepped configuration, respectively, (16, 17).

7. A connector according to one or more of the preceding claims, **characterized in that** said insulating material comprises polytetrafluoroethylene (PTFE) or polyethylene (PE).

8. A RF coaxial connector female part, **characterized in that** it is a female part (1) having one or more of the features of the connector according to the preceding claims 1 to 7.

9. A RF coaxal connector male part, **characterized in that** it is a male part (13) having one or more features of the connector according to the preceding claims 1 to 7.

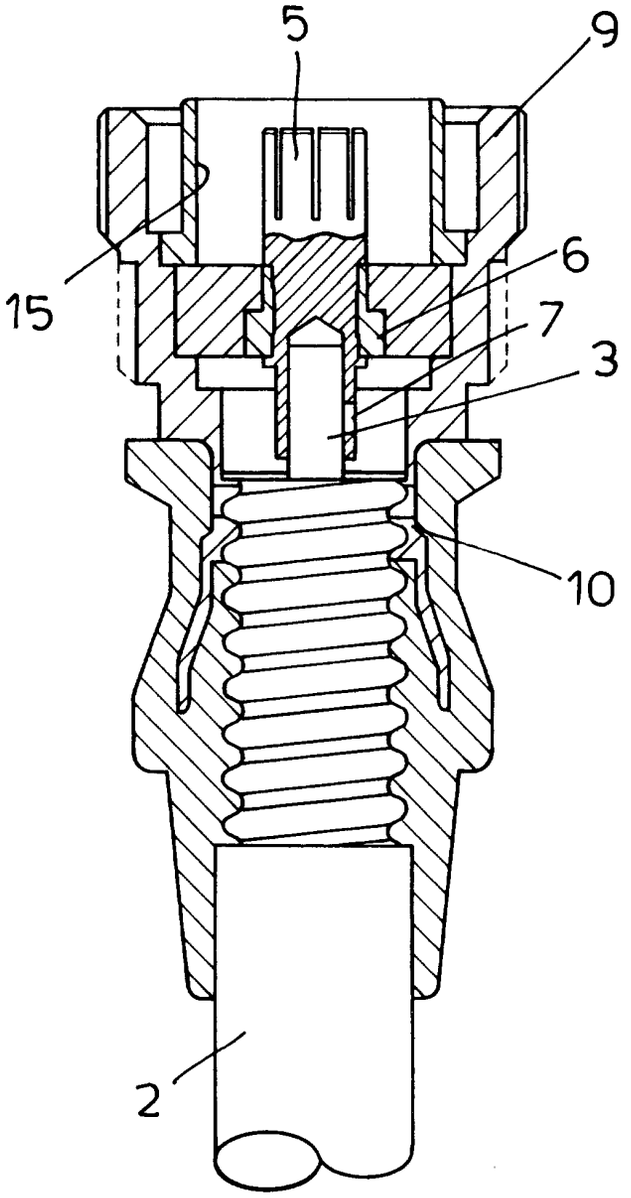

FIG 1

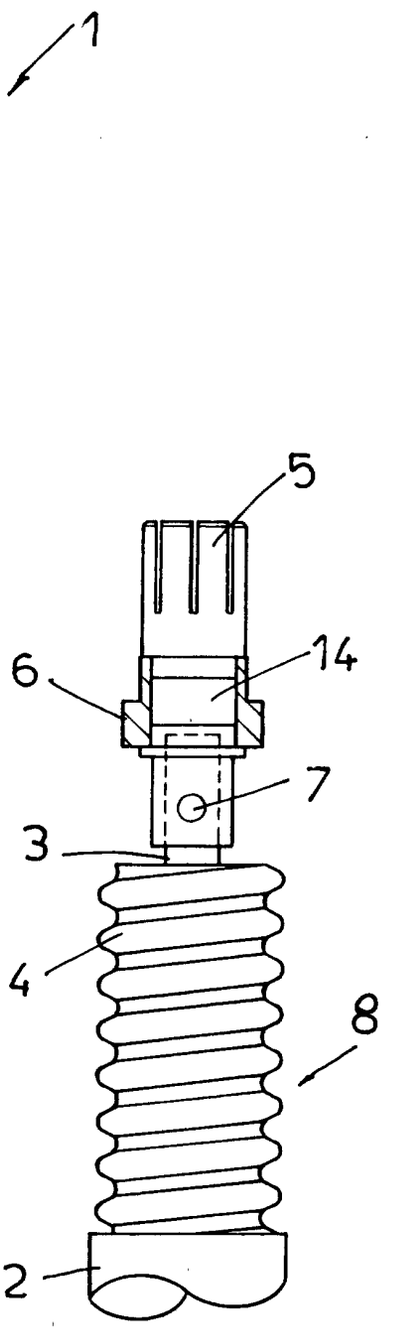

FIG 2

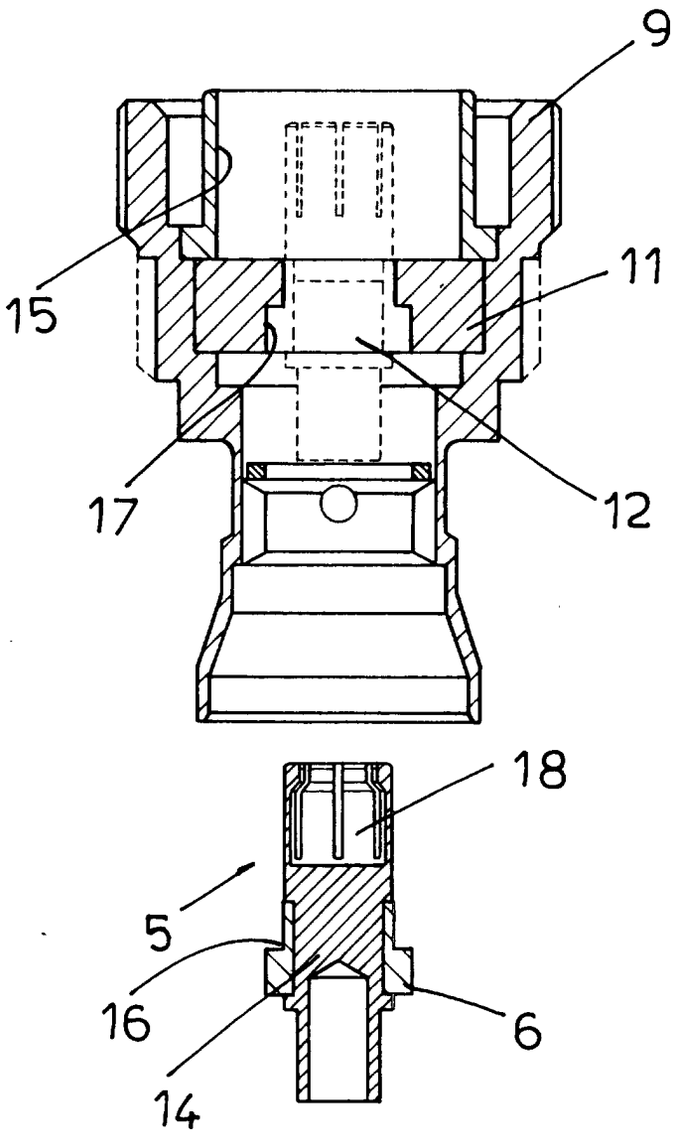

FIG 3

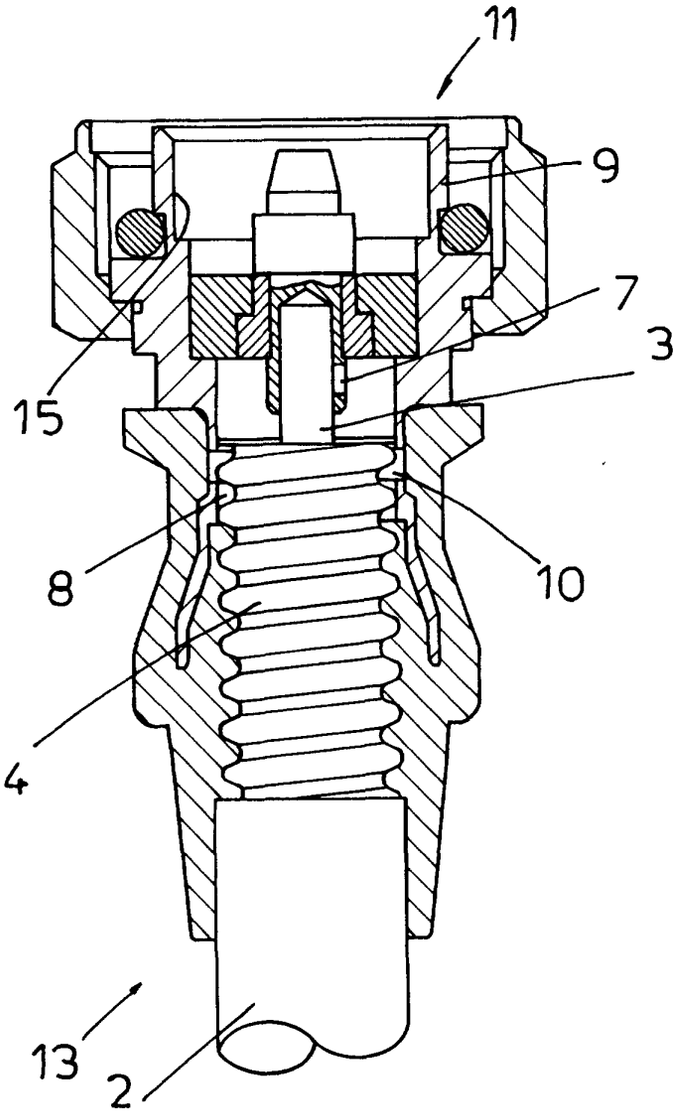

FIG 4

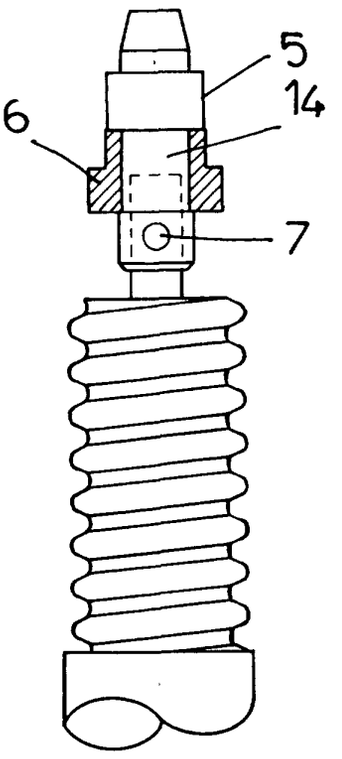

FIG 5

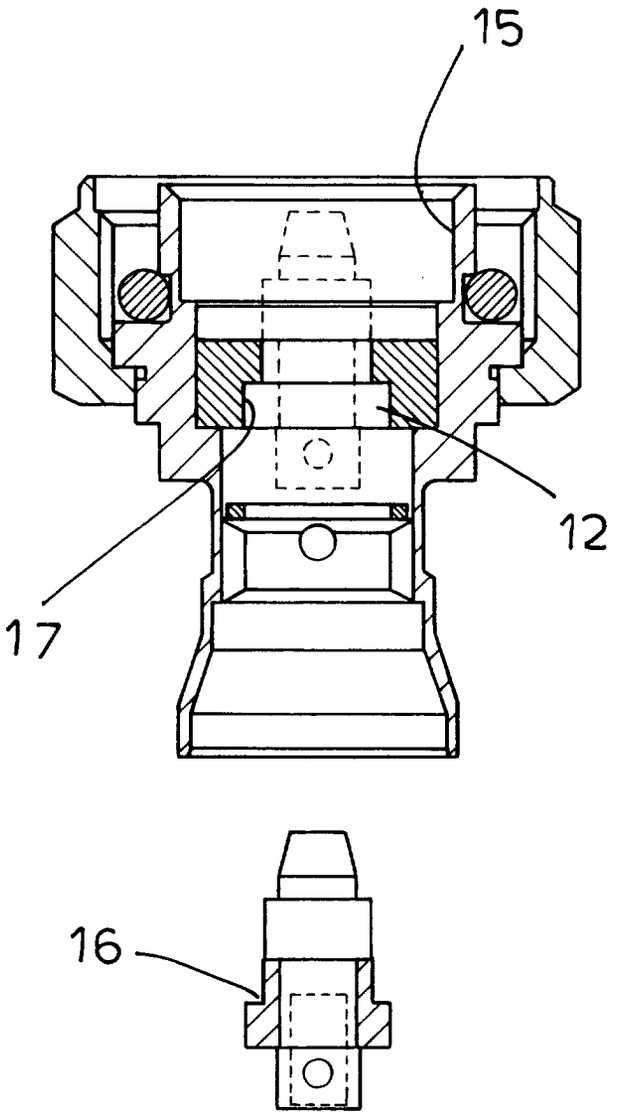

FIG 6