(54) Titre : PRISE DE CLOISON POUR CONNECTEUR COAXIAL A CONTACTS MALES ET FEMELLES
(54) Title: BULKHEAD SOCKET FOR A CO-AXIAL PLUG AND SOCKET CONNECTOR

(57) Abrégé/Abstract:
The invention relates to a housing coupler (100) for a coaxial plug-in connector, particularly of the N-type, comprising a cylindrical housing (10), which forms an outer conductor and which has a coaxial cable-side end (12) and a plug-side end (14). The arrangement is characterized in that a groove (34) is formed on an inner wall of the housing (10) next to the plug-side end (14) while extending in an annular manner and forming a detent edge (30).
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(72) Erfindern: und

(75) Erfinder/Anmelder (nur für US): ROSENBERGER,

(54) Title: HOUSING COUPLER FOR A COAXIAL PLUG-IN CONNECTOR

(54) Bezeichnung: GEHÄUSEKUPPLER FÜR EINEN KOAXIALSTECKVERBINDER

(57) Abstract: The invention relates to a housing coupler (100) for a coaxial plug-in connector, particularly of the N-type, comprising a cylindrical housing (10), which forms an outer conductor and which has a coaxial cable-side end (12) and a plug-side end (14). The arrangement is characterized in that a groove (34) is formed on an inner wall of the housing (10) next to the plug-side end (14) while extending in an annular manner and forming a detent edge (30).

[Fortsetzung auf der nächsten Seite]
Zur Erklärung der Zweibuchstaben-Codes und der anderen Abkürzungen wird auf die Erklärungen ("Guidance Notes on Codes and Abbreviations") am Anfang jeder regulären Ausgabe der PCT-Gazette verwiesen.

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(57) Zusammenfassung: Bei einem Gehäusekuppler (100) für einen Koaxialsteckverbinder, insbesondere vom N-Typ, mit einem zylinderförmigen, einen Außenleiter ausbildenden Gehäuse (10), welches ein koaxialkabelseitiges Ende (12) und ein steckseitiges Ende (14) aufweist, ist die Anordnung derart getroffen, das an einer Innenwandung des Gehäuses (10) benachbart zum steckseitigen Ende (14) eine ringförmig umlaufende Nut (34) ausgebildete ist die eine Rastkante (30) ausbildet.
Bulkhead socket for a co-axial plug and socket connector

The present invention relates to a bulkhead socket for a co-axial plug and socket connector, particularly of the N-type, having a cylindrical shell which forms an outer conductor and has a co-axial cable end and a mating end, as defined in the preamble to claim 1. The invention also relates to a coaxial plug and socket connector having a co-axial plug and a bulkhead socket, in particular of the N type, as defined in the preamble to claim 4.

Co-axial plug and socket connectors comprise a co-axial plug and a co-axial bulkhead socket which, when plugged together and connected to one another, produce co-axial plug-in contact. To allow a plug and socket to be connected in the case of co-axial plug and socket connectors of the so-called N type, the socket has a thread on its outer circumference. The plug is fitted with a union nut which likewise has a thread, on its inner circumference. To connect an N plug and an N socket, they are plugged together and the union nut of the N plug is screwed, by its inside thread, onto the outside thread on the N socket. The connection of co-axial plug and socket connectors of the N type in this way has long been known and provides a good and secure HF contact between the plug and socket. However, it is often felt to be a disadvantage that a screwing operation which takes a relatively large amount of manual effort and a relatively long time has to be performed to connect the plug and socket. In applications where, for example, a large number of co-axial connections have to be made
between plugs and sockets, the manual effort and time spent adds up to a considerable total.

The object underlying the invention is to simplify a bulkhead socket or a co-axial plug and socket connector in respect of the connecting and disconnecting operations, the intention being for reliability in operation to be preserved in full with regard to the transmission of HF signals.

This object is achieved in accordance with the invention by a bulkhead socket of the above-mentioned kind having the features which are characterised in claim 1 and by a co-axial plug and socket connector of the above-mentioned kind having the features which are characterised in claim 4. Advantageous embodiments of the invention are defined in the respective sets of further claims.

In a bulkhead socket of the above-mentioned kind, provision is made, in accordance with the invention, for a groove which extends round in an annular shape to be formed in an inside wall of the shell, adjacent the mating end.

This has the advantage that a co-axial plug having an elastically resilient latching part which fits into the groove in the shell can be fastened to the bulkhead socket.

In a preferred embodiment, a mating end of the groove, which mating end forms the latching edge, is spaced 2.8 mm to 3 mm, and in particular 2.9 mm, away from the mating end of the bulkhead socket.

The shell usefully has on its outer circumference a thread to engage with an inside thread in a union nut belonging to a conventional co-axial plug. In this way,
the bulkhead socket can, if desired, also be connected to a standardised conventional co-axial plug which has screwed fastening means.

In a co-axial plug and socket connector of the above kind, provision is made in accordance with the invention for the bulkhead socket to be formed as described above.

This has the advantage that the co-axial plug-in connection can be connected and disconnected again easily, quickly and with an assurance of reliable operation without screwed connections having to be operated.

In a preferred embodiment, the co-axial plug comprises a cylindrical outer-conductor part of its shell which forms an outer conductor and which has a mating end and a co-axial cable end, a latching sleeve being provided which fits round the outer-conductor part of the shell and which is axially displaceable relative to the outer-conductor part of the shell. A spring is provided which is supported by one of its ends against the outer-conductor part of the shell and by its other end against the latching sleeve, in such a way that the latching sleeve is pre-loaded in the direction of the co-axial cable end of the outer-conductor part of the shell. The latching sleeve to be formed to have axial slots at its mating end so that elastically resilient latching tongues are formed, said latching tongues each having, at their mating ends, a latching edge which extends upwards in a radially outward direction, to latch onto the latching edge of the groove in the bulkhead socket. Also provided is an unlocking sleeve which surrounds the latching sleeve and is displaceable axially relative to the latching sleeve, the latching sleeve having a ramp which extends upwards in a radially outward direction and which
slopes up in the direction of the co-axial cable end, which ramp co-operates with a correspondingly bevelled groove in an inside face of the unlocking sleeve in such a way that displacement of the unlocking sleeve relative to the latching sleeve in the direction of the co-axial cable end causes the latching tongues of the latching sleeve to bend inwards radially.

A stop for the latching sleeve is usefully formed at the co-axial cable end of the outer-conductor part of the shell, which stop sets a limit for axial movement of the latching sleeve in the direction of the co-axial cable end of the outer-conductor part of the shell.

The invention will be explained in detail below by reference to the drawings. In the drawings:

Fig. 1 is a side view, partly in section, of a preferred embodiment of bulkhead socket according to the invention.

Fig. 2 is a view in section of a co-axial plug which fits the bulkhead socket shown in Fig. 1, and

Fig. 3 is a view in section of the bulkhead socket of Fig. 1 and the co-axial plug of Fig. 2, in the plugged-together state.

Fig. 1 shows a preferred embodiment of a bulkhead socket 100, formed in accordance with the invention, of the N type for a co-axial plug and socket connector, having a cylindrical shell 10 which forms an outer conductor and which has a co-axial cable end 12, a mating end 14, and, on its outer circumference, an outside thread 16. The bulkhead socket 100 also comprises a centre conductor 18, an insulating part 20, a female solder connection 22, a hexagon nut 24, a shakeproof washer 26 and an O-ring 28.
This N-type bulkhead socket 100 is of a standardised design, except as follows: at the mating end 14, there is formed in the inner circumference of the shell 10, by means of a groove 34 which extends round in an annular shape in an inside face of the shell 10, a latching edge 30. The groove 34 is formed by stock-removing machining of the standardised inner circumference of the shell 10, at the mating end 14. This configuration of the inner circumference of the shell 10 at the mating end 14, which is non-standard, is of a form such that operation is not adversely affected in any way when a conventional co-axial plug having a union nut is plugged in, which means that even a standardised N-type co-axial plug having an internally threaded union nut can be fastened to a bulkhead socket as shown in Fig. 1.

Because of the design according to the invention of the bulkhead socket 100, it is also possible to plug in a specially designed co-axial plug of a quick-action fastening type. This special co-axial plug has a latching element which engages behind the latching edge 34 and, in co-operation with the latching edge 34, makes a mechanically firm connection between the bulkhead socket and the co-axial plug.

A specially designed co-axial plug 200 of this kind is shown by way of example in Fig. 2 and comprises a cylindrical outer-conductor part 36 of the shell which forms an outer conductor, a centre conductor 38, an insulating part 40, a latching sleeve 42, an unlocking sleeve 44 and a compression ring 46. The outer-conductor part 36 of the shell has a mating end 48 and a co-axial cable end 50. The latching sleeve 42 fits round the outer-conductor part 36 of the shell. A spring 52 is provided which is supported by one of its ends against
the outer-conductor part 36 of the shell and by other end against the latching sleeve 42, in such a way that the latching sleeve 42 is pre-loaded in the direction of the co-axial cable end 50 of the outer-conductor part 36 of the shell. At the co-axial cable end 50 of the outer-conductor part 36 of the shell, there is formed a stop for the latching sleeve 42 in the form of the compression ring 46, which sets a limit for axial movement of the latching sleeve 42 in the direction of the co-axial cable end 50 of the outer-conductor part 36 of the shell. At its mating end 48, the latching sleeve 42 is formed to have axial slots, thus producing elastically resilient latching tongues 54. At their mating ends, these latching tongues 54 each have a latching edge 56 which extends upwards in a radially outward direction. The unlocking sleeve 44 surrounds the latching sleeve 42 and is axially displaceable relative to the latching sleeve 42. The latching sleeve 42 has a ramp 58 which extends upwards in a radially outward direction and which slopes up in the direction of the co-axial cable end 50, which ramp 58 co-operates with a correspondingly bevelled groove 60 in an inside face of the unlocking sleeve 44 in such a way that displacement of the unlocking sleeve 44 relative to the latching sleeve 42 in the direction of the co-axial cable end 50 causes the latching tongues 54 of the latching sleeve 42 to be bent radially inwards.

Fig. 3 shows the way in which the locking mechanism between the bulkhead socket 100 and the co-axial plug 200 operates, parts which perform the same functions being denoted by the same reference numerals as in Figs. 1 and 2, for which reason reference should be made to the above description of Figs. 1 and 2 for an explanation of them. In the plugged-in state, the latching tongues 54 having
the latching edges 56 engage behind the latching edge 34 of the groove 34. This produces a locking retention between the bulkhead socket 100 and the co-axial plug 200 without a screwed connection having to be made for this purpose. Instead, the co-axial plug 200 merely has to be pushed into the bulkhead socket 100. Because the latching edge 56 is of a ramp-like configuration, it automatically slides past the latching edge 30, the latching tongues 44 being bent radially inwards elastically, and into the groove 34. The unlocking sleeve 44 is used to release this latched mechanical connection again. For this purpose, the unlocking sleeve 44 is displaced axially, relative to the latching sleeve 42, or in other words relative to the outer-conductor part 36 of the shell, in the direction of the co-axial cable end 50 of the co-axial plug 200. Because of this, the bevelled groove 60 slides over the ramp 58 on the latching sleeve 42, whereby the latching tongues 54 are bent radially inwards. This causes the latching edge 56 to be freed from its engagement with the latching nose 30, thus enabling the co-axial plug 200 to be withdrawn from the bulkhead socket 100.

The co-axial plug 200 which fits the bulkhead socket 100 formed in accordance with the invention is formed as follows:

Co-axial plug 200 for a co-axial plug and socket connector, particularly of the N type, wherein the co-axial plug 200 comprises a cylindrical outer-conductor part 36 of its shell which forms an outer conductor and which has a mating end 48 and a co-axial cable end 50, characterised in that a latching sleeve 42 is provided which fits round the outer-conductor part 36 of the shell and which is axially displaceable relative to the outer-
conductor part 36 of the shell, in that a spring 52 is
provided which is supported by one of its ends against
the outer-conductor part 36 of the shell and by its other
end against the latching sleeve 42, in such a way that
the latching sleeve 42 is pre-loaded in the direction of
the co-axial cable end 50 of the outer-conductor part 36
of the shell, in that the latching sleeve 42 is formed to
have axial slots at its mating end 48 so that elastically
resilient latching tongues 54 are formed, said latching
tongues 54 each having, at their mating ends, a latching
edge 56 which extends upwards in a radially outward
direction, and in that an unlocking sleeve 44 is provided
which surrounds the latching sleeve 42 and is
displaceable axially relative to the latching sleeve 42,
the latching sleeve 42 having a ramp 58 which extends
upwards in a radially outward direction and which slopes
up in the direction of the co-axial cable end 50, which
ramp 58 co-operates with a correspondingly bevelled
groove 60 in an inside face of the unlocking sleeve 44 in
such a way that displacement of the unlocking sleeve 44
relative to the latching sleeve 42 in the direction of
the co-axial cable end 50 causes the latching tongues 54
of the latching sleeve 42 to bend inwards radially.

Co-axial plug and socket connector 200 as described
in the previous paragraph, characterised in that there is
formed, at the co-axial cable end 50 of the outer-
conductor part 36 of the shell, a stop 46 for the
latching sleeve 42, which stop 46 sets a limit for axial
movement of the latching sleeve 42 in the direction of
the co-axial cable end 50 of the outer-conductor part 36
of the shell.
Claims

1. Bulkhead socket (100) for a co-axial plug and socket connector, particularly of the N-type, having a cylindrical shell (10) which forms an outer conductor and has a co-axial cable end (12) and a mating end (14), characterised in that there is formed in an inside wall of the shell (10), adjacent the mating end (14), a groove (34) which extends round in an annular shape and which forms a latching edge (30).

2. Bulkhead socket (100) according to claim 1, characterised in that a mating end of the groove (34), which mating end forms the latching edge (30), is spaced 2.8 mm to 3 mm, and in particular 2.9 mm, away from the mating end (14) of the bulkhead socket (100).

3. Bulkhead socket (100) according to claim 1 or 2, characterised in that the shell (10) has on its outer circumference a thread (16) to engage with an inside thread in a union nut belonging to a conventional co-axial plug.

4. Co-axial plug and socket connector (100, 200) having a co-axial plug (200) and a bulkhead socket (100), particularly of the N type, characterised in that the bulkhead socket (100) is formed in accordance with at least one of claims 1 to 3.

5. Co-axial plug and socket connector (100, 200) according to claim 4, characterised in that the co-axial plug (200) comprises a cylindrical outer-conductor part (36) of its shell which forms an outer conductor and which has a mating end (48) and a co-axial cable end (50), a latching sleeve (42) being provided which fits round the outer-conductor part (36) of the shell and which is axially displaceable relative to the outer-
conductor part (36) of the shell, in that a spring (52) is provided which is supported by one of its ends against the outer-conductor part (36) of the shell and by its other end against the latching sleeve (42), in such a way that the latching sleeve (42) is pre-loaded in the direction of the co-axial cable end (50) of the outer-conductor part (36) of the shell, in that the latching sleeve (42) is formed to have axial slots at its mating end (48) so that elastically resilient latching tongues (54) are formed, said latching tongues (54) each having, at their mating ends, a latching edge (56) which extends upwards in a radially outward direction, to latch onto the latching edge (30) of the groove (34) in the bulkhead socket (100), and in that an unlocking sleeve (44) is provided which surrounds the latching sleeve (42) and is displaceable axially relative to the latching sleeve (42), the latching sleeve (42) having a ramp (58) which extends upwards in a radially outward direction and which slopes up in the direction of the co-axial cable end (50), which ramp (58) co-operates with a correspondingly bevelled groove (60) in an inside face of the unlocking sleeve (44) in such a way that displacement of the unlocking sleeve (44) relative to the latching sleeve (42) in the direction of the co-axial cable end (50) causes the latching tongues (54) of the latching sleeve (42) to bend inwards radially.

6. Co-axial plug and socket connector (100, 200) according to claim 5, characterised in that there is formed, at the co-axial cable end (50) of the outer-conductor part (36) of the shell, a stop (46) for the latching sleeve (42), which stop (46) sets a limit for axial movement of the latching sleeve (42) in the
direction of the co-axial cable end (50) of the outer-conductor part (36) of the shell.