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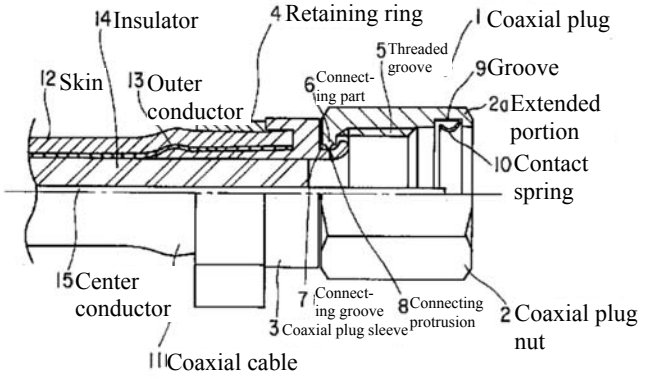
(54) [Title of Invention] Coaxial plug for electronic equipment

(57) [Abstract]
[Problem] To effectively prevent contamination with ingress noise by ensuring contact between external shells that are grounding parts even when attached to a coaxial connector.
[Means of Resolution] Coaxial plug 1 comprises nut 2, sleeve 3 and retaining ring 4. Nut 2 has formed on its inside a threaded groove 5 that screws together with a coaxial connector, and is open at its head part, and the peripheral edge of this opening is formed in a ring shape to serve as a connecting part 6 to sleeve 3. This connecting part 6 is further provided with a connecting protrusion 8 along its inner peripheral surface. In coaxial plug nut 2, an attachment port for the coaxial connector is extended, and a groove 9 is formed on the inner peripheral surface of the extended part 2a thereof to provide a contact spring 10 which abuts the coaxial connector. In sleeve 3, the end part of the side that connects with nut 2 is projected to form a connecting groove 7, and the connecting protrusion 8 of connecting part 6 is brought into contact with the outer peripheral surface of this connecting groove 7 so that nut 2 and sleeve 3 are continuously electrically connected.



[Scope of Claims]
[Claim 1] In the context of a coaxial plug wherein a ring shaped connecting part fitted to the head part of a coaxial plug nut is rotatably connected to a connecting groove provided in the outer periphery of the distal end portion of a coaxial plug sleeve, and a coaxial connector is attached by means of a threaded groove formed on the inside of the aforementioned nut, a coaxial plug for electronic equipment characterized by being equipped with a connecting protrusion provided along the inner peripheral surface of the connecting portion of the aforementioned nut, which makes sliding contact with the peripheral surface of the connecting groove that is formed in the aforementioned sleeve, an extension portion that is formed by the extension of the attachment port of the coaxial connector, a groove that is provided on the inside of this extension portion, a contact spring that is provided inside this groove and presses against the aforementioned coaxial connector, and a retaining ring fitted to the aforementioned sleeve that fixes the position of the coaxial cable.
[Detailed Description of the Invention]
[0001]
[Technical Field of the Invention] The present invention relates to a coaxial plug for electronic equipment that minimizes ingress noise when the connector is connected to, for instance, a CATV device.
[0002]
[Prior Art] Previously, for instance in the context of a CATV system, etc, the coaxial plug that is attached to the coaxial connector of an electronic device has been constituted as shown in Figure 3. Figure 3 is a drawing that shows a partial cutaway of an existing coaxial plug 1. The aforementioned coaxial plug 1 comprises coaxial plug nut 2, coaxial plug sleeve 3 and retaining ring 4. The aforementioned coaxial plug nut 2 has formed on its inside a threaded groove 5 that screws together with a coaxial connector, and is open at its head part, and the peripheral edge of this opening is formed in a ring shape to serve as a connecting part 6 to sleeve 3. Meanwhile, coaxial plug sleeve 3 protrudes at the end portion of the side which connects to coaxial plug nut 2 to form connecting groove 7, and the ring shaped connecting part 6 of the aforementioned coaxial plug nut 2 is positioned from the outside of this connecting groove 7 to connect it with coaxial plug nut 2. In this case, the ring shaped connecting part 6 of coaxial plug nut 2 is provided slidably within the connecting groove 7 of coaxial plug sleeve 3. That is to say, coaxial plug nut 2 is connected rotatably with respect to coaxial plug sleeve 3.
[0003] And, coaxial cable 11 is attached to the aforementioned coaxial plug 1. This coaxial cable 11 comprises skin 12, outer conductor (braided wire) 13, insulator 14 and central conductor 15.
[0004] In the case that coaxial cable 11 is connected to the aforementioned coaxial plug 1, the distal end of coaxial plug sleeve 3 is inserted between outer conductor 13 and insulator 14 of coaxial cable 11, and is fixed by crimping from the outside of skin 12 with retaining ring 4. In this manner, a ground connection is made with outer conductor 13 of coaxial cable 11.
[0005] To connect the coaxial plug 1 constituted as above to the coaxial connector of a device, the threaded part of the coaxial connector is inserted into the threaded groove 5 of coaxial plug nut 2, and coaxial plug nut 2 is rotated to affix the two together. At this time, the central conductor 15 of the coaxial cable 11 electrically connected by pressing it against the center contact of the coaxial connector.
[0006] [Problems to be Solved by the Invention] When the above existing coaxial plug 1 is attached to the coaxial connector of an electronic device, while rotating coaxial plug nut 2 to fasten the threaded part of the coaxial connector, the contact between the external shells which are the grounding parts is not made reliably, and is in an extremely unstable state. That is to say, under the above existing coaxial plug 1, when tightening has not been completed during connection with a coaxial connector, the contacts between coaxial plug nut 2 and coaxial plug sleeve 3, and between coaxial plug nut 2 and the coaxial connector are not made reliably. When the aforementioned coaxial plug 1 is attached to the coaxial connector of an electronic device, in particular the coaxial connector of an electronic device in the context of a CATV system, the problem exists that if contact between the outer shells which are the grounding parts is in a state which is not sufficient, the connector will be in an open condition, resulting in the influx of external noise becoming extremely high, and causing interference in the form of ingress noise to the CATV system.
[0007] The present invention has been made in order to resolve the above problem, and aims to provide a coaxial plug for electronic equipment that allows reliable contact between the outer shells that are the grounding parts even while being attached to a coaxial connector, reliably preventing contamination with ingress noise.
[0008] [Means of Resolving the Problems] In the context of a coaxial plug wherein a ring shaped connecting part fitted to the head part of a coaxial plug nut is rotatably connected to a connecting groove provided in the outer periphery of the distal end portion of a coaxial plug sleeve, and a coaxial connector is attached by means of a threaded groove formed on the inside of the aforementioned nut, the present invention is characterized by being equipped with a connecting protrusion provided along the inner peripheral surface of the connecting portion of the aforementioned nut, which makes sliding contact with the peripheral surface of the connecting groove that is formed in the aforementioned sleeve, an extension portion that is formed by the extension of the attachment port of the coaxial connector, a groove that is provided on the inside of this extension portion, a contact spring that is provided inside this groove and presses against the aforementioned coaxial connector, and a retaining ring fitted to the aforementioned sleeve that fixes the position of the coaxial cable.
[0009] [Embodiments of the Invention] Hereinafter, one embodiment of the present invention is explained with reference to the drawings.
[0010] Figure 1 is a partial cross sectional view that shows the construction of the coaxial plug for electronic equipment of one embodiment of the present invention, while Figure 2 is a partial cross sectional view that shows the state of the coaxial plug of the said embodiment in the state of being connected to a coaxial connector.
[0011] Coaxial plug 1 comprises coaxial plug nut 2, coaxial plug sleeve 3 and retaining ring 4. The aforementioned coaxial plug nut 2 has formed on its inside a threaded groove 5 that screws together with a coaxial connector, and is open at its head part, and the peripheral edge of this opening is formed in a ring shape to serve as a connecting part 6 to sleeve 3. This ring shaped connecting part 6 is further provided with a connecting protrusion 8 along its inner peripheral surface. In addition, the aforementioned coaxial plug nut 2 is formed by extension of the attachment side of the coaxial connector, and groove 9 is formed along the inside peripheral surface of this extended part 2a, and contact spring 10 is provided inside this groove 9. This contact spring 10 protrudes slightly from the inner peripheral surface of the aforementioned extended part 2a, such that upon attachment with a coaxial connector, it abuts with the said coaxial connector.

[0012] Meanwhile, coaxial plug sleeve 3 protrudes at the end portion of the side which connects to coaxial plug nut 2 to form connecting groove 7, and the ring shaped connecting part 6 of the aforementioned coaxial plug nut 2 is positioned from the outside of this connecting groove 7 to rotatably connect it with coaxial plug nut 2. In this case, each dimension of the connecting protrusion 8 provided to ring shaped connecting part 6 is set such that it makes sliding contact with the peripheral surface of the connecting groove 7 of coaxial plug sleeve 3, in order that coaxial plug nut 2 and coaxial plug sleeve 3 are continuously electrically connected. Moreover, in the case that the aforementioned coaxial plug sleeve 3 is connected to coaxial plug nut 2, the outer diameter of the end portion on the side that connects with coaxial plug nut 2 of coaxial plug sleeve 3 is formed to match the diameter of ring shaped connecting protrusion 8 of coaxial plug nut 2, such that after the distal end portion thereof is inserted into ring shaped connecting protrusion 8, a tapered fixture is pressed into and expands in this inserted end portion from the front end opening of coaxial plug nut 2 in order to connect it to coaxial plug nut 2.

[0013] And, coaxial cable 11 is attached to the aforementioned coaxial plug 1. This coaxial cable 11 comprises skin 12, outer conductor (braided wire) 13, insulator 14 and central conductor 15.

[0014] In the case that coaxial cable 11 is connected to the aforementioned coaxial plug 1, the distal end of coaxial plug sleeve 3 is inserted between outer conductor 13 and insulator 14 of coaxial cable 11, and is fixed by crimping from the outside of skin 12 with retaining ring 4. In this manner, a ground connection is made with outer conductor 13 of coaxial cable 11. In addition, although central conductor 15 of coaxial cable 11 is inserted within coaxial plug 1, the position of its tip is set to be sited slightly inwards from contact spring 10.

[0015] And, as shown in Figure 2, the aforementioned coaxial plug 1 is attached to coaxial connector 21. This coaxial connector 21 has a threaded part 23 that screws together with the threaded groove 5 of the aforementioned coaxial plug nut 2 on the outside of shell 22. Furthermore, the central section of the aforementioned shell 22 is provided with a female center contact 24 that makes contact with the central conductor 15 of coaxial cable 11.

[0016] In the case that the coaxial plug 1 constituted as above is attached to the coaxial connector 21 of an electronic device, when extended part 2a of coaxial plug nut 2 is inserted into coaxial connector 21, firstly, contact spring 10 presses against threaded part 23 of coaxial connector 21, and coaxial plug nut 2 and coaxial connector 21 are electrically connected. In addition, coaxial plug nut 2 and coaxial plug sleeve 3 are electrically connected by the connecting protrusion 8 provided to the ring shaped connecting part 6 of coaxial plug nut 2. Accordingly, when coaxial plug 1 is connected to coaxial connector 21, the outer shells that are the grounding parts maintain a reliably connected state.

[0017] In the above state, coaxial connector 21 is further inserted into coaxial plug nut 2, and threaded part 23 of coaxial connector 21 is brought into contact with threaded groove 5 while coaxial plug nut 2 is rotated, in order to fix the two together by fastening. At this time, the central conductor 15 of the coaxial cable 11 electrically connected by pressing it against the female center contact 24 of the coaxial connector. In addition, even in the state wherein the aforementioned coaxial plug nut 2 is being rotated to fasten it to coaxial connector 21, the external shells are maintained in a state of reliable contact by means of the connecting protrusion 8 and contact spring 10 provided to the aforementioned ring shaped connecting part 6. Consequently, even when coaxial plug 1 and coaxial connector 21 are connected, the influx of external noise from between coaxial plug nut 2 and shell 22 of coaxial connector 21, and between coaxial plug nut 2 and coaxial plug sleeve 3 is able to be prevented, and even when used in, for instance, a CATV system, interference caused by ingress noise is able to be reliably prevented.

[0018] [Effects of the Invention] Under the present invention as explained in detail above, in the context of a coaxial plug in which a coaxial plug nut is combined with a coaxial plug sleeve, a connecting protrusion is provided to the connecting part of the nut combined with the aforementioned sleeve to make it constantly contact the aforementioned sleeve, and, the aforementioned nut extends from the attachment port of the coaxial connector, and a contact spring is provided to this attachment port such that it abuts the outer peripheral surface of a coaxial connector, and thereby, when connecting the coaxial plug to a coaxial connector, reliable contact is able to be made between the external shells which are the grounding parts, and contamination with ingress noise is able to be reliably prevented.

[Brief Description of the Drawings]

[Figure 1] A partial cross sectional view that shows the construction of the coaxial plug for electronic equipment of one embodiment of the present invention.

[Figure 2] A partial cross sectional view that shows the coaxial plug for electronic equipment of the said embodiment in the state of being connected to a coaxial connector

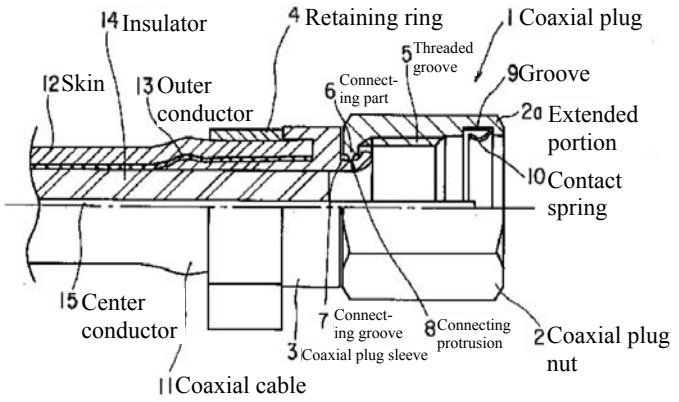
[Figure 3] A partial cross sectional view that shows the construction of an existing coaxial plug for electronic equipment.

[Explanation of the Reference Numerals]

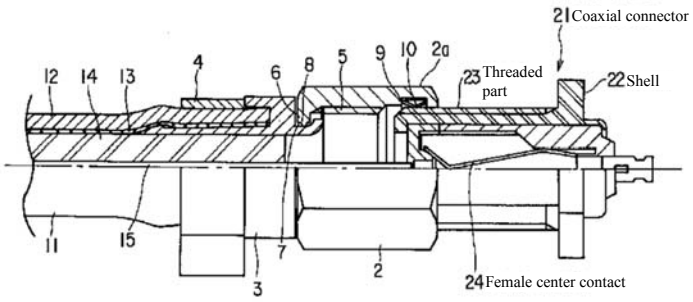
1. Coaxial plug
2. Coaxial plug nut
2a. Extended portion of coaxial plug nut
3. Coaxial plug sleeve
4. Retaining ring
5. Threaded groove
6. Ring shaped connecting part
7. Connecting groove
8. Connecting protrusion
9. Groove

10. Contact spring
11. Coaxial cable
12. Skin
13. Outer conductor
14. Insulator
15. Center conductor
21. Coaxial connector
22. Shell
23. Threaded part
24. Female center contact

[Figure 1]



[Figure 2]



[Figure 3]