

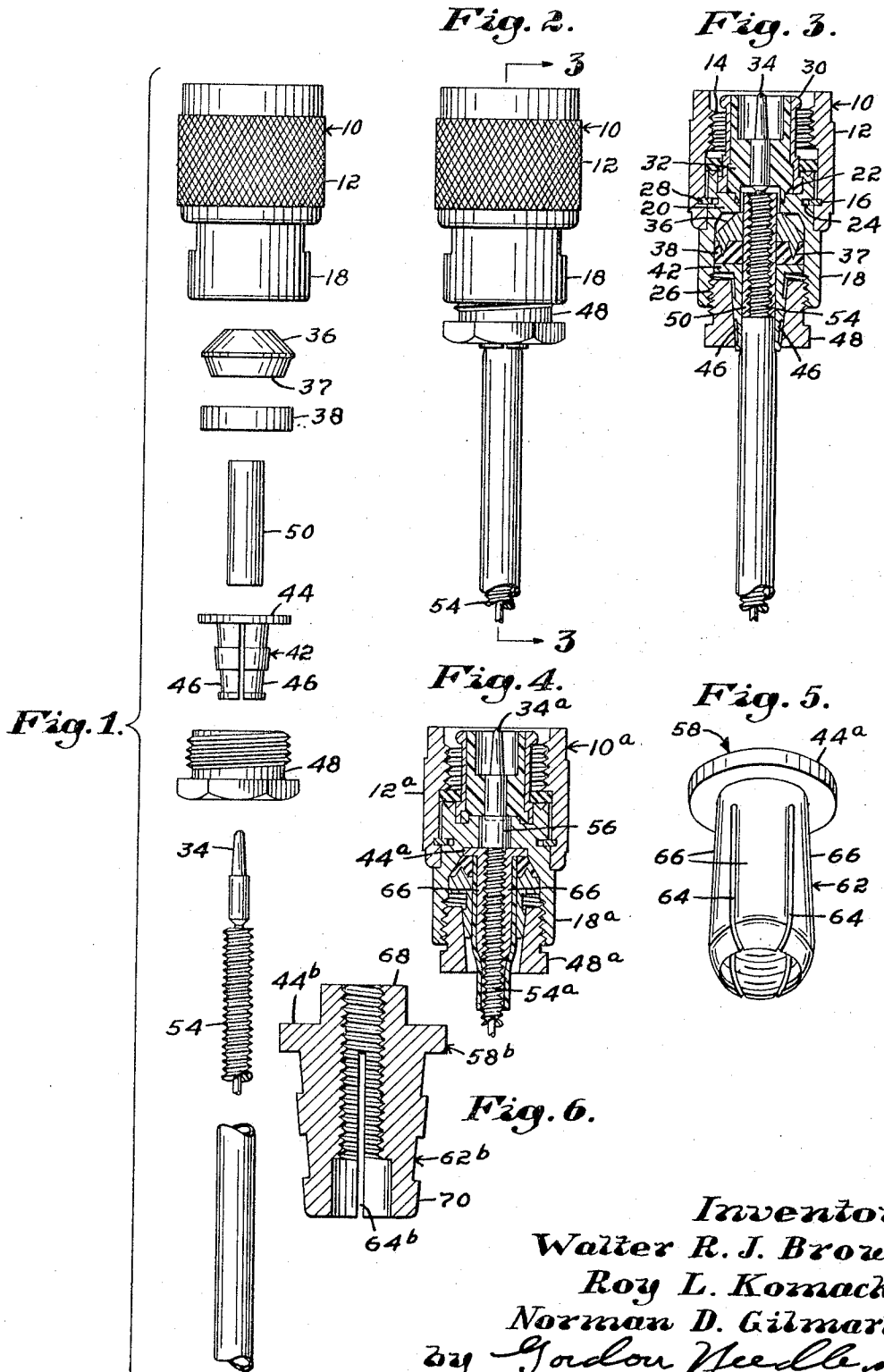
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GROOVED COAXIAL CABLE CONNECTOR

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3,320,575

## GROOVED COAXIAL CABLE CONNECTOR

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The present invention relates generally to electrical connectors and in particular to a coaxial connector for connecting an externally grooved coaxial cable transmission line to an electrical apparatus.

Since the discovery of the grooved coaxial cable it has been found that none of the present connectors available on the market will work to make an efficient electrical connection. The present invention is a solution to the problem of making the required connection.

An object of the present invention is to provide a connector adapted to engage an externally grooved coaxial cable.

A further object of the present invention is to provide a connector which may be threaded onto an externally grooved cable.

Other objects of the invention will, in part, be obvious and will, in part, appear hereinafter.

In the drawings:

FIG. 1 is an exploded view of the connector and the grooved coaxial cable;

FIG. 2 is a side elevation of the assembly of the connector shown in FIG. 1;

FIG. 3 is a side elevation taken on line 3-3 of FIG. 2;

FIG. 4 is a cross section of a variation of a connector shown in FIG. 3;

FIG. 5 is a side elevation of the adaptor shown in FIG. 4; and

FIG. 6 is a cross section of another variation of the adaptor.

There is shown in the drawings a plug housing 10 comprising a shell 12 which is generally tubular in configuration, open at both ends, which includes internal threads 14 at its upper portion and an internal groove 16 spaced from the end opposite from that proximate to the threads 14, a body portion 18 which is also tubular in configuration and which includes an upper portion having a web portion 20 providing an internal shoulder 22 and an external groove 24 and a lower portion which includes internal threading 26. To connect the shell 12 with the body portion 18 a C-clamp or ring 28 is engaged within the external groove 24 and then pressure is applied allowing the internal surface of the shell 12 to slide over the C-ring 28 until it is in line with the groove 16 and will then snap into the groove 16 thereby locking the two parts together as shown in FIG. 3. An outer contact 30 is engaged within the cavity of the plug housing 10 and is provided with an inner insulating plastic insert 32, both of which are engaged against the shoulder 22 of the body portion 18 as shown in FIG. 3. The "Teflon" insert 32 is provided to insulate the outer contact 30 from the inner or pin contact 34. The next element in the assembly is a gasket slicer or compressor 36 which has the form of a truncated cone and includes a sharp cutting edge 37. A rubber gasket 38 is placed within the body portion 18 and against the cutting edge 37 of the gasket slicer 36 which has already been placed within the body portion 18 against the opposite side of the web portion 20 from the internal shoulder 22 as shown in FIG. 3. This gasket 38 may contain a channel, formed on its upper surface. The slicer 36 is pressed against the floor of the channel. A collet clamp 42 which comprises a head portion 44 and a series of legs 46 which

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are spaced from each other around the periphery of an aperture formed through the base portion 44 and which extend away from the base 44. The legs 46 are angled toward each other defining an inside and an outside taper. A clamp nut 48 which is externally threaded and has a head portion is utilized to connect the assembly together. The plug housing 10, the shell 12, the body portion 18, the outer contact 30, the "Teflon" insert 32, the gasket slicer 36, the rubber gasket 38, the collet clamp 42, and the clamp nut 48 all have axial apertures or openings for purposes to be described hereinafter. An adaptor element 50 formed of an electrically conductive material is generally tubular in configuration and has internal threading.

A pin or male contact 34 is attached, by soldering for example, to the inner conductor of an externally grooved and plated coaxial cable 54. This cable has an external sleeve or insulator associated therewith.

To assemble the connector, the adaptor element 50 is threaded onto the threads formed by the external grooving of the plated coaxial cable 54. The gasket slicer 36 is dropped into the body portion 18 to butt against the web portion 20 with the cutting edge 37 directed away from the web portion 20. The gasket 38 is then placed against the cutting edge 37. And the collet clamp 42 is placed on the rubber gasket 38 with its head portion 44 in abutting relationship therewith. At this juncture all of the apertures formed through the different elements are in axial alignment. The inner contact 34 with its attached coaxial cable 54 and the threaded on adaptor element 50 are now passed through the apertures formed by the elements until the male contact 34 protrudes within the area defined by the insert 32. The clamp nut 48 is now passed over the coaxial cable 54 with its insulation and between the collet clamp 42 and the body portion 18 and is then threaded into engagement through its external threading with the internal threading of the body portion 18. As the clamp nut 48 is threaded onto the body portion 18 the legs 46 of the collet clamp 42 which provide a taper are pressed against the insulation of the coaxial cable 54 as well as against the external surface of the adaptor element 50. When the threading is completed the assembly is ready for use.

FIGS. 4 and 5 disclose a variation of the connector shown in FIGS. 1 through 3. Most of the elements are the same except that an insulating or plastic collar 56 is interposed between the pin contact 34a and the outer conductor of the coaxial cable 54a. This is accomplished by stripping the outer conductor back for a short distance and then engaging the collar 56 around the inner conductor. The pin contact 34a may then be soldered on the inner conductor thereby sandwiching the collar 56 between the pin contact 34a and the external conductor of the coaxial cable 54a. A further change is that the collet and adaptor are combined to provide a slide-proof collet 58. The slide-proof collet 58 comprises a head portion 44a and a tubular barrel portion 62 which includes a series of longitudinal slots 64 spaced from each other around the circumference of the barrel portion 62 to provide a series of arms 66. Each of the slots 64 extends from the terminal end of the barrel portion 62 to a point spaced from the head portion 44a. If desired, one or more of the slots 64 may be extended up to the head portion 44a to vary the flexibility of some of the arms 66. The arms 66 extend at a slight angle from the head portion 44a. In other words, the arms 66 for the greater portion of their length are biased away from the axis of the barrel portion 62. The arms 66 are also threaded on their inside surfaces. The engagement of the slide-proof collet 58 is the same in most respects as the engagement of the collet and adaptor combination described hereinbefore except that the internal

threads of the biased arm 66 proximate the head will engage in threaded relation with the coaxial cable 54a for only part of the length of the barrel portion 62 and when the clamp nut 48a is engaged with the assembly the remaining length of the arm 66 will be forced into a clamping threaded engagement with the remaining portion of the cable 54a to be engaged.

A further variation of the slide-proof collet 58b is shown in FIG. 6. In this case, an extension 68 which has an axial bore, and which is internally threaded protrudes above the head portion 44b. The internal threading is stopped at a predetermined distance from the open end of the tubular barrel portion 62b, as shown in FIG. 6, to provide a non-threaded clamp portion 70. The external configuration of the slide-proof collet 58b is the same as the collet 42 with the exception of the extension 68. Longitudinal slots 64b are provided as in the collet 42 from the head portion 44b to the open end through the clamp portion 70. Engagement of this assembly is the same as that of the collet 42 and adaptor 50 shown in FIG. 3.

If desired, an angular slicer portion (not shown) may be placed on the under surface of the flange of the head portion 44b to do away with the slicer 36 and thereby further simplify the assembly.

With reference to the foregoing description it is to be understood that what has been disclosed therein represents only a single embodiment of the invention and is to be construed as illustrative rather than restrictive in nature; and that the invention is best described by the following claims:

What is claimed:

1. An electrical connector for engagement with an externally grooved coaxial cable, said connector including a housing assembly comprising a tubular shell, a tubular body portion, a separate clamp nut and a collet clamp, means engaging said body portion with said shell which permits said shell to rotate relative to said body portion, said body portion having an internally threaded portion, said collet clamp comprising a head portion, a

series of legs extending from said head portion and aperture means through which the coaxial cable extends, said legs being spaced from each other around the periphery of said aperture means and having internally threaded means associated therewith for threading onto the external grooves of the coaxial cable, said clamp nut having an externally threaded portion and having a tapered aperture formed therethrough, a portion of said collet clamp lying within said body portion and said externally threaded portion of said clamp nut circumscribing a portion of said legs of said collet clamp and threaded into engagement with said internally threaded portion of said body portion, whereby when said clamp nut is screwed into said body portion, said legs cause said threaded means to press against the coaxial cable to make an electrical connection therewith.

2. An electrical connector for engagement with an externally grooved coaxial cable according to claim 1 wherein said threaded means comprises a tubular internally threaded adapter element.

3. An electrical connector for engagement with an externally grooved coaxial cable according to claim 1 wherein said threaded means comprises a series of threads formed on the inner surface of said legs.

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