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CONNECTION DEVICE OF LOW CAPACITY FOR CONCENTRIC CABLES

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Fig. 1

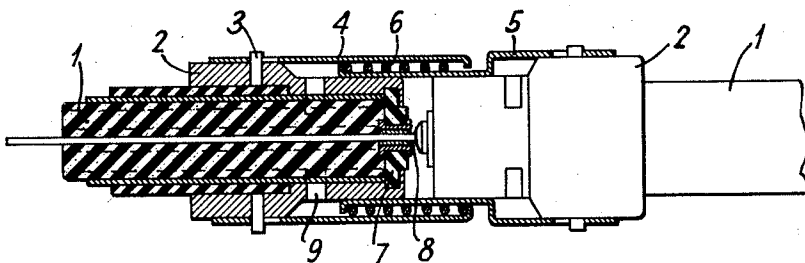


Fig. 2

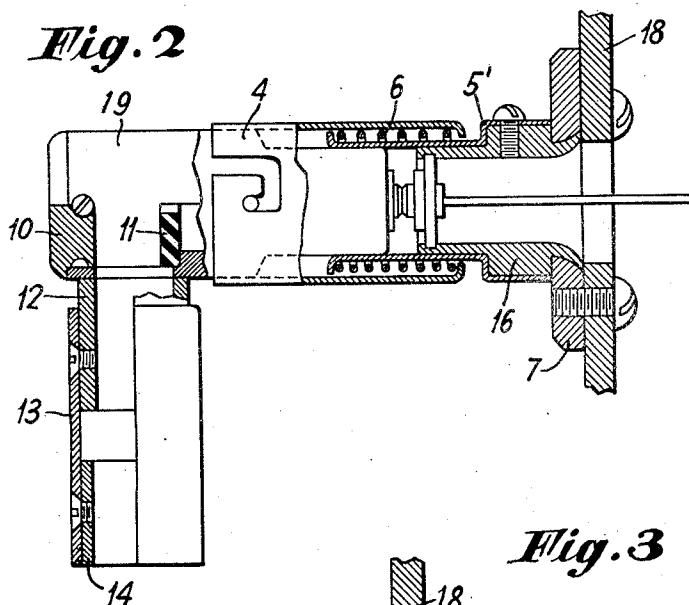
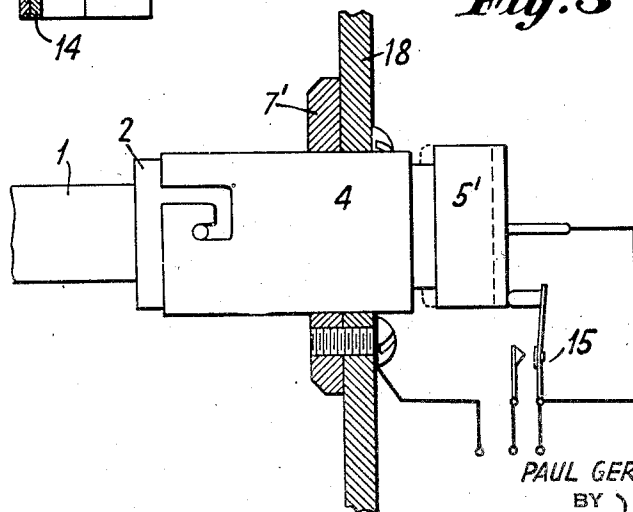


Fig. 3



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CONNECTION DEVICE OF LOW CAPACITY
FOR CONCENTRIC CABLESPaul Gerhardt Violet, Berlin, Germany; vested in
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5 Claims. (Cl. 173—328)

This invention relates to a new and useful connection device of low capacity for a concentric cable.

In the high frequency field, concentric cable gain an ever increasing usefulness as antenna leads and energy lines, as well as connection cables between apparatus and structures and the like, which is true as regards practical operation, as well as laboratory work. Such connection lines which can be easily disconnected and reversed, are especially necessary in the television field. As connection means for such cables the known banana plugs were hitherto available. Due to the lack of suitable constructions, the outer hull or conductor could not be connected concentrically with the apparatus or with other cables and it terminated usually in a plug at a litz wire, as a result of which a gap existed in the shielding. Where short connections for high frequency had to be established between the pairs of terminals of high apparent resistance, for instance between the anode of a tube and the grid of a second tube, whereby both tubes were arranged in different amplifier boxes, the ordinary banana plug of 4 mm. in diameter represented a considerable capacity. This capacity was found to be especially appreciable where at two such plugs, a concentric outer ring was used as continuation of the outer conductor of the cable. In addition in view of mechanical reasons and manufacture, as insulation material for such plugs, only such materials have been used which were characterized by a high electric loss, such as hard rubber, and the like.

The connection device for concentric cables described in the following has as compared with the hitherto known condition the advantages indicated below:

1. The capacity added by the connection contacts is reduced to a minimum and therefore in the case of amplifier circuits, there is no loss in amplification such as caused by the additional capacity, and in the case of connections of longer cables, no discrepancies in the course of the apparent resistance occur at the places of joining.

2. Owing to the low capacity and the use of high-quality ceramic material a considerable decrease of the dielectric losses is obtained.

3. The shielding is carried out in a concentric fashion.

4. A severance of a connection by itself is rendered impossible by means of a bayonet lock.

This invention will best be understood by referring to the accompanying drawing, in which:

Fig. 1 is a longitudinal view mostly in section of the connection device of this invention;

Fig. 2 is a side view partly in section showing a connection device of this invention forming an angular connection joint; and

Fig. 3 is an elevation of a plug arrangement for connecting to apparatus.

Fig. 1 shows the connection of two concentric cable parts 1 which at both ends have the novel plugs. Items 2 represent the outer conductor metallic end bushing forming connection bodies; item 3 is the lateral pin which engages bayonet slots of the parts 4 and 5, as seen in elevation in Fig. 2. Items 4 and 5 represent a connection sleeve to which a springiness is imparted by the helical spring 6 which draws the connection pieces against each other. The front end of each one of the connection end bushings have inserted therein the insulating plate 7 made of high quality ceramic material and the said plate is riveted on through the projecting metal border which is bent over said plate. The tubular rivet 8 is pressed into 7 and serves as a contact member. The inner cable wire is introduced through 8 and soldered thereon. The metallic cable covering is soldered onto the connection body 2 through lateral slots 9 cut into said covering.

Fig. 2 shows the connection of an apparatus and in this case the plug connection organ forms an angle joint. The body 16 is riveted onto the flange 7; item 18 is the outer wall of the respective apparatus. In the springy sleeve arrangement 4 to 6 the part 5' is screwed onto 16.

The angular connection body consists of the socket body 19, the lateral attachment 12 and the end cover 10. Item 11 is an insulating disk for guiding the inner conductor wire, item 13 is a connection sleeve and 14 is a ring into which the cable covering or outer conductor is soldered. The contacts at the parts 5' and 9 are the same as in the case of Fig. 1.

Fig. 3 shows another construction of a direct connection to an apparatus. The flange 7' is in this case soldered together with the sleeve 4. While according to Fig. 2 the connection was obtained by pulling through the sleeve part 4 and turning it at the same time, in Fig. 3 the arrangement is such that the connection is provided in plug proper by being pushed in and slightly turned at the same time. Whereby, part 5' displaces itself towards the interior of the apparatus thus also permitting the carrying out of additional connections by springy contacts 15, or the like.

What is claimed is:

1. A connection device for joining a concentric cable having inner and outer conducting means comprising a first and a second terminating member for said outer conducting means, detachable securing means located on each terminating member, an insulating member secured to an end of each terminating member, a metallic member secured to each insulating member which is small with respect thereto, said metallic member electrically connected to said inner con-

ducting means, a first metallic sleeve surrounding and electrically connected to one of said terminating members, said first metallic sleeve having engaging means for the detachable securing means on one of said end terminating members, said first metallic sleeve having a bent-up portion at the end opposite said engaging means, a second metallic sleeve surrounding and electrically connected to the other one of said terminating members, said second metallic sleeve having engaging means for the detachable securing means on the last mentioned end terminating member, said second metallic sleeve having a bent-down portion at the end opposite said engaging means, and a helical extension spring surrounding and retained at one end by the bent-up portion of said first sleeve and retained at the other end at the bent-down portion of said second sleeve to draw the conducting means of said concentric cable together.

2. A connection device for joining a concentric cable having inner and outer conducting means comprising a first and a second terminating member for said outer conducting means, a lateral pin located on each terminating member, an insulating member secured to an end of each terminating member, a metallic member secured to each insulating member which is small with respect thereto, said metallic member electrically connected to said inner conducting means, a first metallic sleeve surrounding and electrically connected to one of said terminating members, said first metallic sleeve having engaging means for the lateral pin on one of said end terminating members, said first metallic sleeve having a bent-up portion at the end opposite said engaging means, a second metallic sleeve surrounding and electrically connected to the other one of said terminating members, said second metallic sleeve having engaging means for the lateral pin on the last mentioned end terminating member, said second metallic sleeve having a bent-down portion at the end opposite said engaging means, and a helical extension spring surrounded and retained at one end by the bent-up portion of said first sleeve and retained at the other end at the bent-down portion of said second sleeve to draw the conducting means of said concentric cable together.

3. A connection device for joining two parts of a concentric cable, each part having an inner and an outer conductor comprising a first and a second metallic bushing electrically connected and secured to an end of each part of the outer conductors of said cable, detachable securing means located on each one of said bushings, an insulating member secured to an end of each bushing, a metallic member secured to each insulating member and which is small with respect thereto, said metallic member electrically connected to each part of the inner conductor, a first metallic sleeve surrounding and electrically connected to one of said metallic bushings, said first metallic sleeve having engaging means for the detachable securing means on one of said bushings, said first metallic sleeve having a bent-up portion at the end opposite said detachable securing means, a second metallic sleeve surrounding and electrically connected to the other one of said metallic bushings, said second metallic sleeve having engaging means for the detachable securing means on the last mentioned bushing, said second mentioned sleeve having a

bent-down portion at the end opposite said engaging means, and a helical extension spring surrounding and retained at one end by the bent-up portion of said first sleeve and retained at the other end at the bent-down portion of said second sleeve to draw the conducting portions of said inner and outer conductors together.

4. A connection device for joining two parts of a concentric cable, each part having an inner and an outer conductor comprising a first and a second metallic bushing electrically connected and secured to an end of each part of the outer conductors of said cable, detachable securing means located on each one of said bushings, an insulating member of low dielectric loss secured to an end of each bushing, a metallic eyelet secured to each insulating member and which is small with respect thereto, said metallic eyelet electrically connected to each part of the inner conductor, a first metallic sleeve surrounding and electrically connected to one of said metallic bushings, said first metallic sleeve having engaging means for the detachable securing means on one of said bushings, said first metallic sleeve having a bent-up portion at the end opposite said detachable securing means, a second metallic sleeve surrounding and electrically connected to the other one of said metallic bushings, said second metallic sleeve having engaging means for the detachable securing means on the last mentioned bushing, said second mentioned sleeve having a bent-down portion at the end opposite said engaging means, and a helical extension spring surrounding and retained at one end by the bent-up portion on said first sleeve and retained at the other end at the bent-down portion of said sleeve to draw the conducting portions of said inner and outer conductors together.

5. A connection device for joining a concentric cable having inner and outer conducting means comprising a first and a second terminating member for said outer conducting means, detachable securing means located on each terminating member, an insulating member secured to an end of each terminating member, a metallic member secured to each insulating member which is small with respect thereto, said metallic member electrically connected to said inner conducting means, a first metallic sleeve surrounding and electrically connected to one of said terminating members, said first metallic sleeve having engaging means for the detachable securing means on one of said end terminating members, said first metallic sleeve having a bent-up portion at the end opposite said engaging means, a second metallic sleeve surrounding and electrically connected to the other one of said terminating members, said second metallic sleeve having engaging means for the detachable securing means on the last mentioned end terminating member, said second metallic sleeve having a bent-down portion at the end opposite said engaging means, a helical extension spring surrounded and retained at one end by the bent-up portion of said first sleeve and retained at the other end at the bent-down portion of said second sleeve to draw the conducting means of said concentric cable together, and a flange secured to one end of said first sleeve for securing it to apparatus, and a connection member within at least one of said sleeves which is arranged to actuate electrically contacts within said apparatus.

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