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[54] SNAP LOCK COAXIAL CONNECTOR

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[52] **U.S. Cl.**.....**339/91 P,** 339/177 R

[51] **Int. Cl.**.....**H01r 13/54,** H01r 17/04

[58] **Field of Search**.....339/46, 91, 177, 217, 59 M, 339/74, 255 P; 285/317, 320

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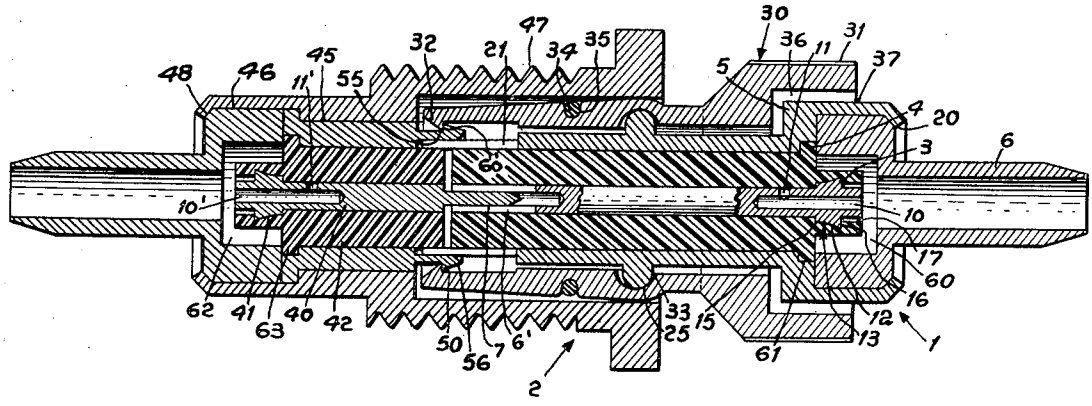
[57] **ABSTRACT**

This invention is for a quick connect and disconnect coaxial coupling. The connector plug portion has a split outer shell latch type of coupling that allows for locking upon direct engagement, and releases when two tabs are pressed inwardly. The connector also has a new method of contact captivation comprising contacts having barbs that allow for easy insertion into a resilient insulation material and tend to retain their axial position when subjected to an axial withdrawal force.

3 Claims, 3 Drawing Figures



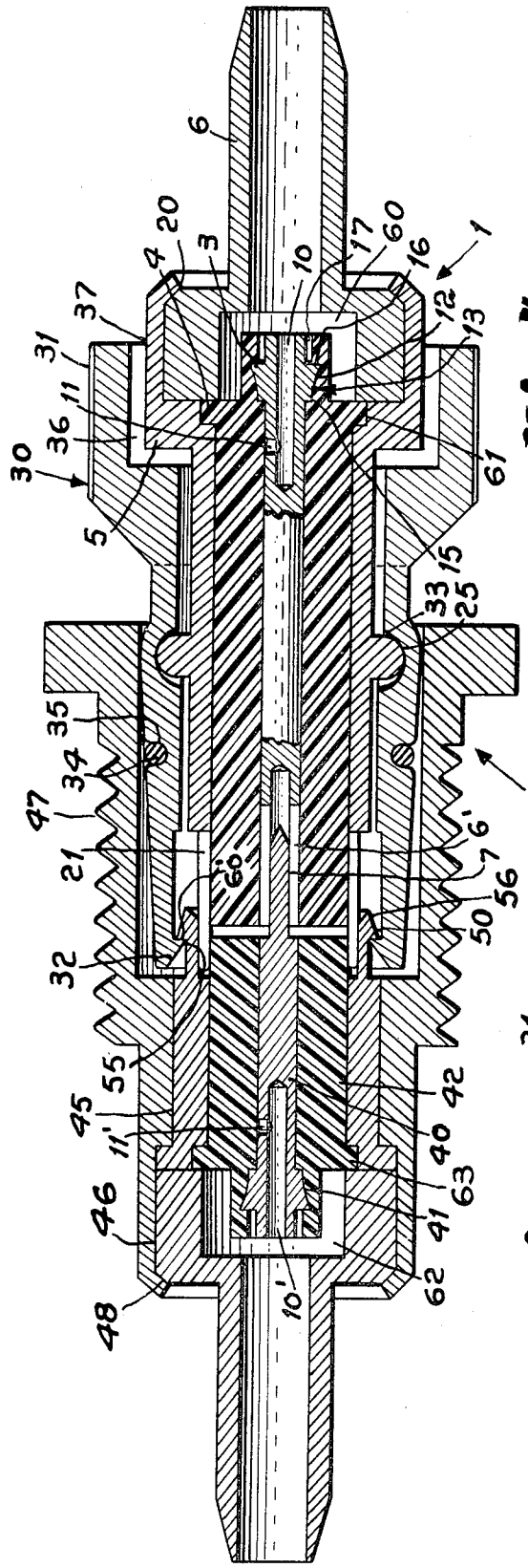


Fig. 1

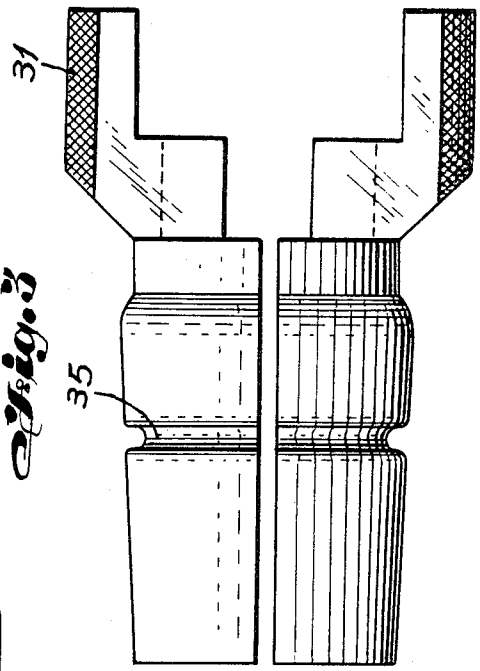


Fig. 3

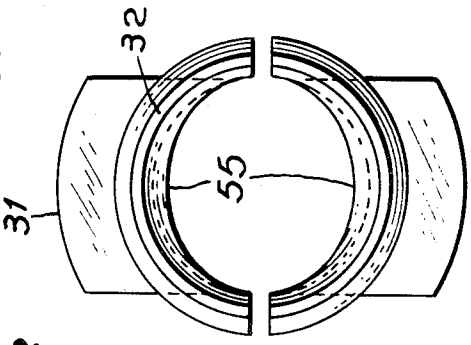


Fig. 2

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SNAP LOCK COAXIAL CONNECTOR

BACKGROUND OF THE INVENTION

Separable coaxial connectors have long been known to the art. Most of these connectors are mated together by insertion of one into the other and are then retained together by means of threaded members. In some cases quick connect and disconnect connectors have been devised but they are generally expensive and required many additional parts. Also a problem with coaxial connectors has been that the conductors are somewhat easily pulled out of the dielectric member from the rear of the connector. Means as pins have been used heretofore but are not always satisfactory.

SUMMARY OF THE INVENTION

It is an object of this invention to provide a quick connect and disconnect coaxial connector that is inexpensive and requires few additional parts.

It is another object of this invention to provide a coaxial connector wherein the inner conductor is securely captivated within the dielectric.

A feature of this invention is a coaxial coupling having inner and outer conductors and a dielectric member spacing these conductors apart. The outer conductor of one coupling member of the coaxial coupling is provided with a latching arrangement which is fixed and not movable. The other coupling member is provided with a split bushing which pivots about a pivot shoulder on the outer conductor of that member and the end of this split bushing has a latching member which engages the fixed latching member of the other coupling member upon insertion of the second coupling member into the first. In order to release and separate the members the split bushing is provided at the free end with a tab which, upon both tabs being pressed down, releases the latch.

Another feature of this invention is that each of the inner conductors has a barb-like shape at the rear end, which, when the inner conductor of the cable attached thereto is inserted into the dielectric member and pushed forward, will enter into a cavity of the dielectric member which is resilient, the shape of the cavity corresponding to the shape of the barb so that when the barb is pushed inwardly and enters the cavity it cannot be retracted and is securely captivated therein.

BRIEF DESCRIPTION OF THE DRAWINGS

Other features of this invention will become apparent from the description that follows taken in conjunction with the accompanying drawings in which:

FIG. 1 is an axial sectional view illustrating the coupling connector of this invention;

FIG. 2 is a front view of the split shell latch of this invention; and

FIG. 3 is a side elevation view of the split shell latch of this invention.

DESCRIPTION OF PREFERRED EMBODIMENT

With reference to FIG. 1, there is shown a coaxial plug 1 and a coaxial jack 2 in mated position. The plug 1 comprises an inner conductor 3 and a dielectric member 4 spacing the inner conductor 3 from the outer conductors 5 and 6. The inner conductor 3 has at the left extremity slotted members or fingers 6 to provide

sliding and resilient contact with the mating member 7 of the jack inner conductor. The opposite extremity of the inner conductor 3 has a coaxial hole 10 to accommodate the inner conductor of a coaxial cable (not shown). There is provided a radial hole 11 to solder the cable inner conductor securely in the axial hole 10. The plug inner conductor 3 is shaped at this end in the form of a barb 12 and the plug dielectric member 4 has a cavity 13 adapted to accommodate the barb 12 therein. As shown the barb 12 is of a frusto-conical shape with a convexly shaped surface and comprises a small diameter portion 15 at one end and a tapering outward to a large diameter portion 16. Although the cone surface is shown convex, it may be flat. The opening 17 of dielectric 4 is large enough to admit the entry of barb 12 and as the barb is pushed farther into the dielectric, which is resilient, the increasing diameter of the barb forces the dielectric outward until the barb is completely within the cavity 13 and captivated therein. It can be seen that any axial pull on the inner conductor 3 will not free the barb 12 from the cavity 13 without, of course, damage to the dielectric. A suitable resilient dielectric material is Teflon, although other resilient dielectrics may be used.

The outer conductor 5 is spun over the outer conductor 6 at the chamfered portion 20 to form, in effect, an outer conductor assembly for the plug 1. The free end 21 comprises a plurality of slotted fingers which will make resilient contact with a corresponding part of the outer conductor of the jack 2. At a suitable point along the length of the outer conductor 5 there is located a pivot shoulder 25 with a rounded perimeter; essentially this is an annular ring surrounding the outer conductor 5.

A split shell latch 30 surrounds the outer conductor assembly 5 and 6 with a space between two parts along the axis of the connector as shown in FIG. 2. Each half of the split shell latch has a tab 31 at one end and a latching member 32 at the other end. The split shell latch is pivoted about the pivot shoulder 25 by means of the cavity 33 which has a larger radius than the radius of the rounded portion of the pivot shoulder 25, as can be seen in FIG. 1, to allow the pivot movement to proceed freely. The two parts of split shell latch 30 are held together about the outer conductor and on the pivot shoulder by a wire ring 34 disposed in annular groove 35 in the split shell latch. A space 36 is provided for between the bottom surface of the tab 31 and the surface 37 of outer conductor 5 to allow for vertical movement of the tab 31 when it is desired to press down the tab to unlatch the two coupling members.

Turning now to jack 2 there is shown the inner conductor 40 which has the protruding portion 7 that mates with the resilient fingers of the inner conductor 3 of the plug member 1. Similarly to the rear configuration of inner conductor 3, inner conductor 40 has the axial hole 10' to accommodate the inner conductor of a coaxial cable and the solder hole 11'. It also has the barb shaped portion 41 which is similar to the barb 12 of plug 1. Dielectric member 42 is constructed in substantially similar fashion to dielectric member 4 with a cavity to accommodate the barb 41. The outer conductor consists of a latching portion 45 and a rear portion 46 which are coupled together by means of a panel mounting 47 which is spun over at the chamfered end

48 to retain all three parts together. The outer conductor member 45 has an end portion 50 which is shaped in the form of a latch to receive and retain the mating latch member 32 of the split shell latch 30. Latch portion 50 is the part of the outer conductor which engages resiliently with the slotted fingers 21 of outer conductor 5 of plug 1. Jack 2 is shown with a panel mounting member 47 but it is understood that it may also be in the form of a coupling which does not have to be fastened to a panel or other mounting member.

It can be seen that when the plug is inserted into jack 2 that the inner conductor members 3 and 40 will mate as will the outer conductor members 50 and 21. As the edge 55 of latching portion 32 of the split shell latch slides over the surface 56 of the outer conductor 45 the split shell latch pivots about pivot shoulder 25 with the tab 31 moving radially downward until the latch portion 60 of latch 32 slides over the corresponding portion of latch 56 and is retained therein by virtue of the pressure of ring 34.

In the coaxial connector art it is important that the diameters of the inner conductor and outer conductor remain constant to avoid impedance mismatch and retarding waves. However, it may be unavoidable in some designs; therefore steps and diameter changes are made in the outer conductor and dielectric to compensate for impedance mismatch due to changes in diameter of inner conductor. This is shown in the plug and jack at 60, 61, 62 and 63. Spaces 60 and 62 are also provided to allow expansion of the dielectric when the barb is forced in.

I claim:

1. A coaxial connector comprising:

first and second coupling members each having an inner conductor, an outer conductor and dielectric means spacing said inner conductor from said outer conductor; and

latching means on the outer conductor of said second member and latching means pivoted on the outer conductor of said first member cooperating with the latching means on the outer conductor of said second member to couple said first and second members together;

said outer conductor of said first member comprising an annular shoulder disposed about the periphery of said outer conductor and said latching means of said first member comprising a split shell latch pivoted on said annular ring, and a wire ring holding said split shell latching in position.

2. A coaxial connector according to claim 1, wherein said split shell latch comprises for each part thereof a substantially semi-circular member having a latch at one end, a tab at the other end, an annular groove inside between said ends adapted to seat on said annular shoulder and pivot thereon, and an annular groove on the outside of said part adapted to receive said wire ring.

3. A coaxial connector according to claim 2 wherein said latching means on the outer conductor of said second member comprises at the inner end thereof means adapted to receive and retain in place upon said latching member the latch of said split shell latch member.

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