# United States Patent

**Somerset**

[15] **3,701,086**

[45] **Oct. 24, 1972**


## [54] COAXIAL CONNECTOR


[72] Inventor: **Sherman J. Somerset,** Marblehead, Mass.

[73] Assignee: **International Telephone and Telegraph Corporation,** Nutley, N.J.



[22] Filed: **May 28, 1971**

[21] Appl. No.: **148,046**

[52] **U.S. Cl.** .....**339/177 R,** 339/89 C

[51] **Int. Cl.** .....**H01r 21/20**

[58] **Field of Search**.....339/60 C, 89 C, 90 C, 91 P, 339/94 C, 126 J, 177 R, 177 E, 276 R, 276 E, 143 R, 143 C, 143 S; 174/21 C, 35 R, 35 C, 35 SM, 35 MS, 71 C, 75 C, 88 C, 89



[56] **References Cited**

UNITED STATES PATENTS

| | | | |
|---|---|---|---|
| 3,551,882 | 12/1970 | O'Keefe | 174/75 C |
| 3,613,050 | 10/1971 | Andrews | 174/75 C |
| 3,598,895 | 8/1971 | Garland | 174/75 C |
| 2,762,025 | 9/1956 | Melcher | 339/177 R |

FOREIGN PATENTS OR APPLICATIONS

| | | | |
|---|---|---|---|
| 1,064,711 | 4/1967 | Great Britain | 174/75 C |



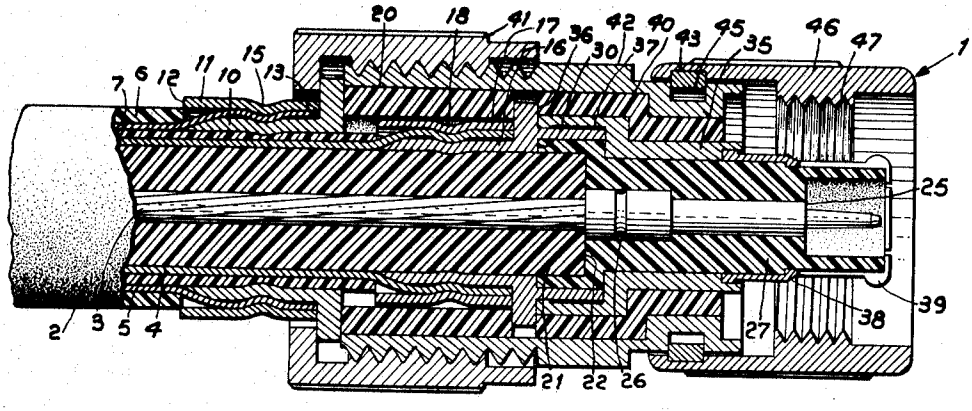
*Primary Examiner*—Marvin A. Champion
*Assistant Examiner*—Lawrence J. Staab
*Attorney*—C. Cornell Remsen, Jr., Walter J. Baum, Paul W. Hemminger, Charles L. Johnson, Jr., Philip M. Bolton, Isidore Togut, Edward Goldberg and Menotti J. Lombardi, Jr.



[57] **ABSTRACT**

This invention is for an electrical connector for a coaxial cable, such as a triaxial cable, which has two concentric outer conductors and an inner conductor, the connector comprising means to clamp separately each of the outer conductors by crimping means to securely fasten each outer conductor to its clamping means.


**1 Claim, 2 Drawing Figures**



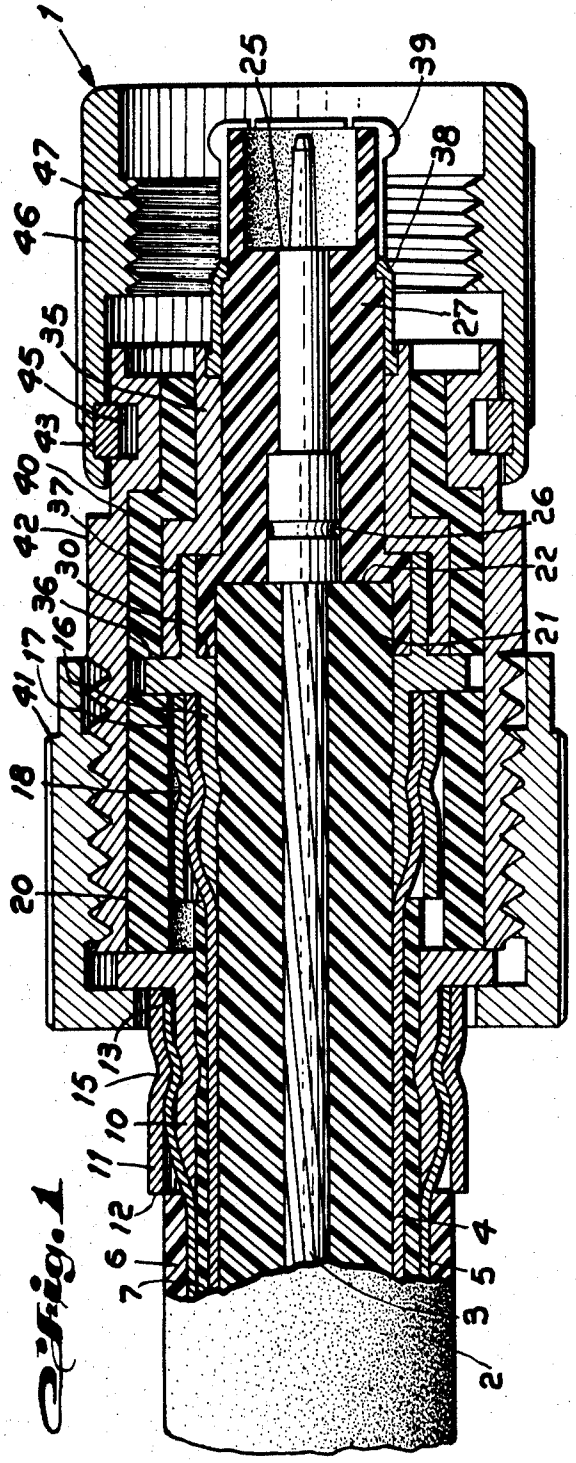



Fig. 1

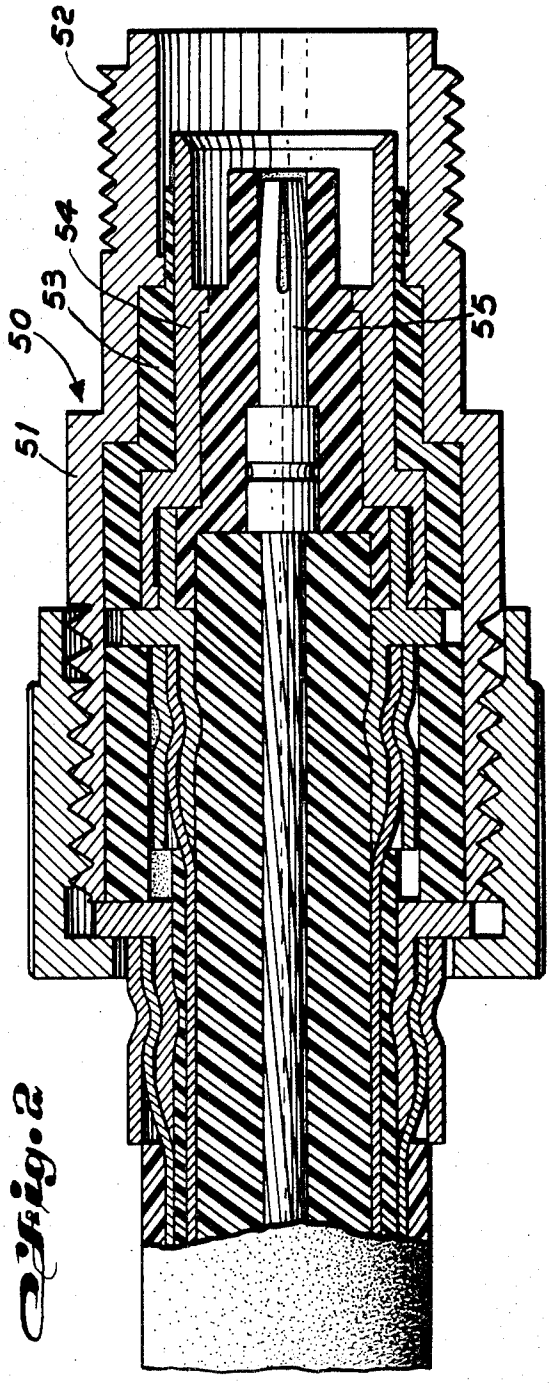



Fig. 2

INVENTOR
SHERMAN J. SOMERSET
BY Isidore Togut
ATTORNEY

# COAXIAL CONNECTOR

## BACKGROUND OF THE INVENTION

This invention relates to an electrical connector for a coaxial cable and more particularly to an electrical connector which is simply and economically fastened to the cable.

The method of connecting an electrical connector to a coaxial or triaxial cable at the present time is by fastening the corresponding metal parts of the connector to the cable such as the inner conductor and the conductive shield or braid thereof by soldering the inner contact of the connector to the inner conductor of the cable and clamping the conductive shield or braid to the body of the connector by means of a complex method such as threaded members. The term "-triaxial cable" is one that is used extensively in the cable industry to denote a coaxial cable with three conductors insulated from each other and having coincident axis.

A typical method for a triaxial cable requires complex cable cuts, at least ten separate parts, and soldering the inner conductor of the cable to the center contact of the connector. Reliability of this connection both electrically and mechanically is questionable until it has been assembled and tested. A considerable amount of time and a high level of skill is required to properly accomplish this assembly. In this cumbersome method the cable end is first squared and a jacket is moved a certain distance from the end. The braid is combined with a nut, a gasket, and a clamp which are placed over the tapered braid. The braid is then flared back over the clamp. A similar operation has to be performed for the inner braid. Then, after the inner conductor of the cable is soldered to the inner contact of the electrical connector, the complete hardware has to be assembled which will clamp together the outer braid contact assembly and the inner braid contact assembly. It can be seen that this is a slow, cumbersome and expensive connection that has to be made to fasten the electrical connector to the cable.

## SUMMARY OF THE INVENTION

It is an object of this invention to provide an electrical connector for a coaxial or triaxial cable which permits assembly and inexpensive fastening thereof.

According to a broad aspect of this invention there is provided a simplified design of an electrical connector which requires a minimum of cable cutting and dressing and also provides a reliable crimp assembly. A connection can be tested prior to assembly assuring a high level of reliability and much less assembly time and use of simple cutting jigs and crimping tools which enables the assembly to be made by average skilled work people.

A feature of this invention is that there is provided an electrical connector, means to crimp and thereby hold firmly to the connector and conductive shield or metallic braids of the electrical cable by crimping to the conductive shields corresponding portions of the electrical connector and crimping the inner contact of the electrical connector to the inner conductor of the cable.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a cross-sectional view of a male connector embodying the invention, and



FIG. 2 is a cross-sectional view of a female connector embodying the invention.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

With reference to FIG. 1, there is shown a male electrical connector 1 attached to a triaxial cable 2. The cable consists of a center conductor 3, an inner conductor shield 4, an outer conductor shield 5, an outer dielectric jacket 6 and an inner dielectric jacket 7 all coaxial with each other. The inner and outer conductor shields may be made, as shown here, of braided metal. The electrical connector 1 comprises a first braid clamp 10 and a metallic outer sleeve 11. As shown in the drawing, the cable is dressed so that the outer jacket 6 is cut down at 12. The outer conductor shield 5 is dressed to terminate evenly all around at 13. The braid clamp 10 is inserted between the inner dielectric 7 and the outer conductor shield 5 so that the outer conductor shield 5 is forced around the outer surface of the braid clamp 10. Overlying the outer conductor shield 5 and the braid clamp 10 is the metallic outer sleeve 11. To fasten the outer conductor shield 5 in a securely captivated manner the outer sleeve 11 is crimped to the outer conductor shield 5 and the braid clamp 10 as shown at 15. The crimp 15 extends all around the periphery of the outer sleeve 11. This arrangement securely fastens the outer braid to the conductive outer sleeve 11 and braid clamp 10. The inner conductor shield 4 is clamped in a similar manner to the inner braid clamp 16 and the inner sleeve 17 by means of the crimp 18 also extending around the periphery of the inner sleeve 17. The inner conductor shield 4, braid clamp 16 and sleeve 17 are isolated from the outer braid clamp assembly by means of a dielectric spacer 20. The cable dielectric 21 is dressed to surface 22. The center conductor 3 of the electrical cable 2 is fastened to center contact 25 of electrical connector 1 by slipping the center contact 25 over the protruding end (not shown) of the center conductor 3 and then crimping the center contact 25 as shown at 26 to secure the center contact 25 to the center conductor 3 of the cable. When this is done, the dielectric member 27 of the connector 1 is then slipped over the center contact 25 until it abuts the surface 30 of the inner braid clamp 16 and surface 22 of the electrical cable. The assembly of the connector is then completed by placing the metallic sleeve 35 over the dielectric member 27 so that the metallic sleeve 35 contacts surfaces 36 and 37 of braid clamp 16. Metallic sleeve 38, which has split fingers 39, is securely fastened to the sleeve 35 by force fit or other known means to provide a continuous electrical contact path to the inner conductor shield 4. Body insulator 40 is then placed over metallic sleeve 35 and the whole assembly is tied together by nut 41 with internal threads which is screwed over the outer conductor body 42. A split ring 43 is disposed in the groove 45 and this split ring captivates the coupling nut 46 with internal threads 47.

It can be seen that by means of crimping the outer conductor shield, the inner conductor shield and the center conductor there is produced an electrical conductor assembly with the triaxial cable which can be easily made by a worker with average skill in a fairly short time. The connection of connector to cable is strong mechanically and positive electrically.

The female connector **50**, FIG. **2**, has exactly the same parts except that the conductive outer body **51** with external threads thereof **52** replaces the outer conductor body **42**, coupling nut **46** and split ring **13** of the male connector. The body insulator **53** is also slightly different from the body insulator **40** of the male connector and the conductor sleeve **54** differs from the conductor sleeve **35** and metallic sleeve **38** of the male connector. Also, the inner contact member **55** is slotted to receive the male contact **25**. The conductive outer sleeve **54** is not slotted in the end thereof for it must receive the slotted member **39**.

It is to be understood that the foregoing description of specific examples of this invention is made by way of example only and is not to be considered as a limitation on its scope.

I CLAIM:

**1**. In a triaxial cable having a center conductor, inner and outer conductive sheaths approximately concentric with said conductor, said inner sheath being positioned inside of said outer sheath, first dielectric means positioned around said conductor to keep said conductor insulated from said inner sheath, and second dielectric means positioned between said sheaths to keep them insulated from each other, an electrical termination comprising: a conductive tube-like first structure



extending around said second dielectric means between said second dielectric means and said outer sheath, said first structure being fixed relative to and in contact with said outer sheath, said first structure having an outwardly extending radial first flange; a conductive tube-like second structure extending around said first dielectric means on one side of said flange between said first dielectric means and said inner sheath, said second structure being fixed relative to and in contact with said inner sheath; third dielectric means extending contiguously around said second structure; a hollow conductive cylinder fitting contiguously around said third dielectric means and abutting said first flange, said cylinder having an inwardly extending radial second flange, said third dielectric means fitting snugly between said first and second flanges; and nut threaded onto the exterior of that portion of said cylinder adjacent said first flange, said first structure being located on the other side of said first flange, said nut having a radially inwardly extending third flange in engagement with said other side of said first flange, said conductor and said inner sheath being exposed for electric connections thereto at a point spaced from said first flange in the direction of said one side thereof.

* * * * *