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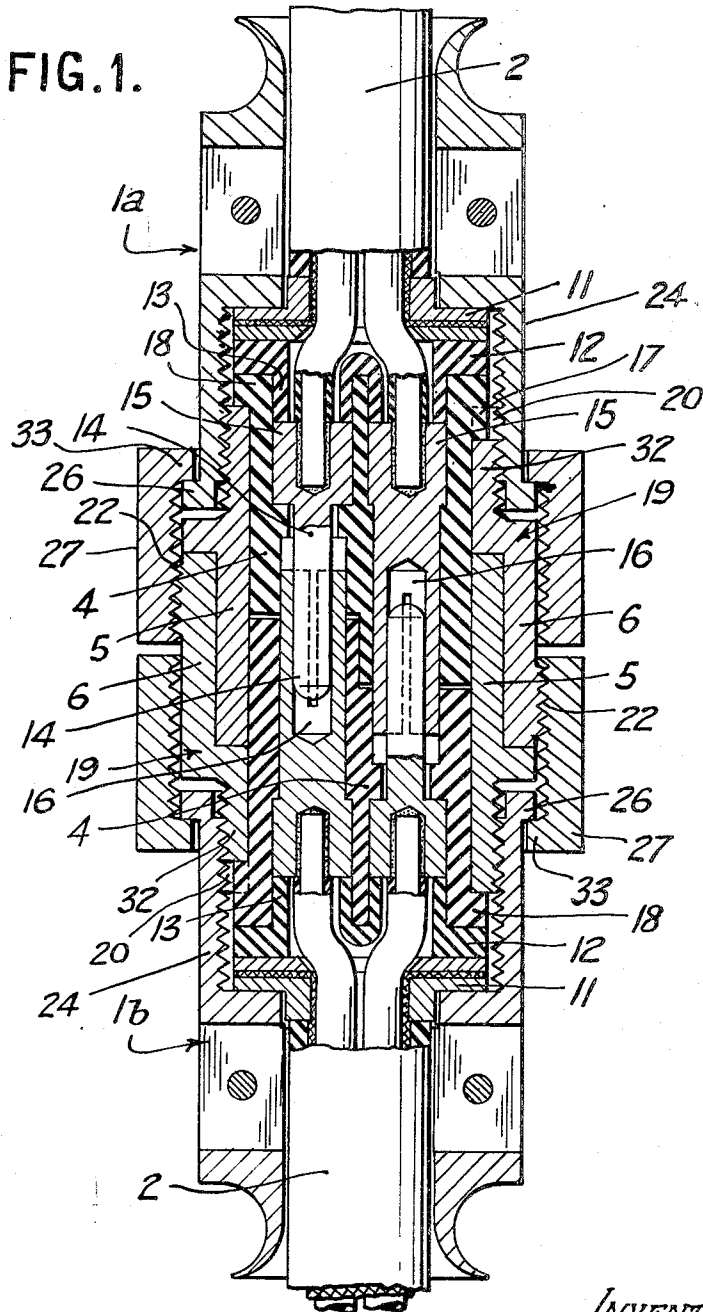
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CONNECTOR OR TERMINAL MEMBER

Filed Nov. 18, 1947

2 Sheets-Sheet 1



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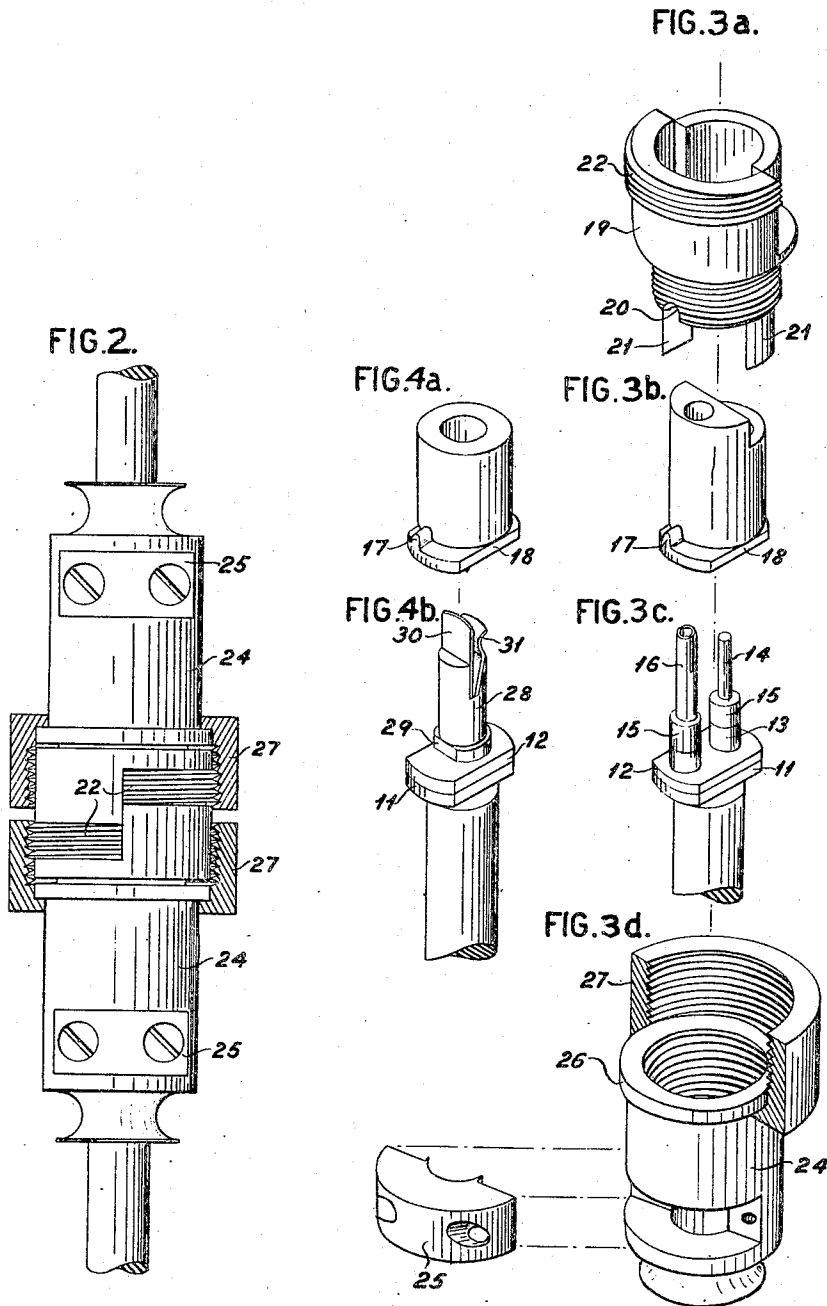
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CONNECTOR OR TERMINAL MEMBER

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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CONNECTOR OR TERMINAL MEMBER

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4 Claims. (Cl. 173—328)

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This invention relates to connectors or termination members for electric cables.

Hereafter the term "connector" is intended to mean a composite structure of two separable parts secured one to each of the cable ends which are to be joined while the term "termination member" is intended to mean the single part of such a connector which is secured to one cable end and which serves to effect physical connection of two cable ends when operatively associated with another termination member. Such termination member may or may not, in itself, perform any electric current conducting function.

Connectors for electric cables more especially tele-communication cables have hitherto been provided by termination members on the respective cable ends, one of which is a male member and the other a female member. In conveniences of this arrangement are the necessity of providing two types of termination members and the fact that in use, attention has to be given to ensuring that two cables to be joined will have termination members of different kinds. Similar considerations apply in the connection of the end of a cable to a termination member or socket on an apparatus.

One object of the invention is the provision of an improved electric cable connector comprising two termination members which will intercouple with each other while a further object is the provision of a termination member which will intercouple with an exactly similar termination member.

A further object of the invention is to provide a termination member capable of interlocking with a similar termination member to constitute an electric cable connector and comprising a tubular body structure having inner and outer coaxial semi-cylindrical tubular projections with a limited region at the free end of said outer projection provided with a screw thread, and an internally threaded sleeve coupling loosely carried upon said body structure with an inwardly directed flange thereon engageable behind a shoulder on said body structure so that the threads of such sleeve coupling can engage with the corresponding threaded region of the outer projection of a similar termination member when placed in mating connection therewith but not with the threads on its own outer projection whereby, upon tightening such sleeve coupling, the two termination members are forcibly drawn towards each other in an axial direction to set up a tightly clamped engagement of the various parts including the electric connection terminals which are carried within said projections.

The invention will be better understood from a description of embodiments thereof illustrated in the accompanying drawings.

Figure 1 is a longitudinal cross-section, drawn

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to enlarged scale, of one embodiment of the invention as applied to a connector for a two-core electric cable.

Figure 2 is a view similar to Figure 1 but with all of the parts except the sleeve couplings shown in elevation.

Figures 3a, 3b, 3c and 3d constitute, in combination, an exploded view of the constituent parts of one termination member of the connector shown in Figures 1 and 2.

Figures 4a and 4b illustrate a modified form of the parts shown in Figures 3b and 3c respectively, suitable for use with a single core cable or a concentric-type cable.

Referring first to Figures 1, 2 and 3a to 3d, the connector comprises two identical termination members indicated generally at 1a, 1b, each secured to the ends of the electric cables 2 which are to be connected together.

Each termination member comprises a generally tubular body structure consisting of an internally threaded outer member 24 and an inner member 19 having an externally threaded cylindrical base 32 screwed into such outer member 24.

The outer or cable-emerging ends of the member 24 are provided with cable clamping means in the form of a separate segment 25 entering into a transverse slot in said member and held in engagement with the cable by means of screws tapped into the body of the member 24.

Within the bore of the inner member 19 is carried an insulating bushing 4 which is suitably bored axially to receive the electric connection terminals of the cable conductors in a manner described in greater detail later. The end of the member 19 is formed at its forward or free end with two semi-cylindrical tubular projections 5, 6. These projections are coaxial with the axis of the tubular structure 3 and are disposed so as each to embrace opposite 180° circumferential regions. The inside radius of the inner projection 5 is made just greater than the radius of the bushing 4 while the outside radius of such projection is made just less than the inside radius of the outer projection 6 whereby an exactly similar pair of projections on the other termination member may be interfitted therewith.

The outer cylindrical surface of the outer projection 5 is provided with an externally projecting screw thread 22 over a limited region lying immediately adjacent its free end, the remainder of its outer surface lying nearer to the threaded boss 32 being unthreaded and of a radius less than the base dimension of the thread 22.

The end of the outer member 24 lying opposite to that provided with the cable clamping means, is formed with a projecting shoulder 26 while loosely disposed around this member is an internally threaded sleeve coupling 27 having an

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inwardly directed flange 33 adapted to seat behind the shoulder 26 in which position the internal threads of the sleeve coupling extend over and surround the unthreaded outer surface region of the adjacent outer projection 6 but do not and cannot reach as far as the threads 22 on such projection.

Further details of the construction will become apparent from the following description of the method of assembly and connection, now to be given in conjunction also with Figs. 3a-3d. To the end of the cable 2 is attached a circular metal disc or washer 11 having two oppositely disposed straight chord surfaces and a ring shaped neck of lesser diameter through which the central portion of the cable is passed. Any braiding on the cable can be soldered to the ring. The top layer of insulation or cording can be bound off below the ring. The cable is assumed to contain a single pair of conductors and the respective conductors are passed through openings in an insulating disc 12 flattened over two oppositely disposed portions corresponding to the similar surfaces on the metal disc 11. A raised collar 13 of insulating material is formed where the two conductors emerge from the disc in order to increase the leakage path between the conductors. The conductors are terminated by inner connecting members each provided with a metal collar 15 comprising respectively a silver plated rod 14 and a slightly longer hollow cylindrical pin 16 adapted to receive a rod of the same size as 14, and provided with longitudinal slots to give a spring effect to grip such a rod. The cable end thus prepared is next inserted into the insulating bushing 4 which as shown in Figures 1 and 3b is in the form of a cylinder with two borings to receive the members 14 and 16 and the collars 15. A small projection 17 is provided for a purpose to be described later. At the lower or cable mounting end the bushing 4 terminates in a disc shaped portion 18 of the same flattened shape as the discs 11 and 12, and at the other end the block is stepped by cutting away a semi-circular segment of the material thereof over the boring for the pin 14. The purpose of this is to assist in forming a firm connection with the cooperating terminal and also to increase the leakage path between the two exposed electric connection terminals 14 and 16 at this point.

The prepared cable end in the bushing 4 is next inserted into the inner member 19 shown in Figs. 1, 2, and 3a. The projection 17 of the bushing 4 fits into a recess 20 in this member 19 to ensure that the bushing is inserted the correct way round. Extension limbs 21 on the member 19 are provided to overlay the flattened portions on the discs 11, 12 and 18 and so prevent rotation of these parts with respect to one another.

Fitting over the cable 2 and screwing over the thread 23 of the member 19 there is provided the internally threaded outer member 24 shown in Fig. 6d.

A variation of the terminal arrangements shown in Figs. 3b and 3c is shown in Figs. 4a and 4b, to be used for single cored cable for example a coaxial cable. Only a single aperture is provided in the disc 12. A central silver plated rod or cylindrical conductor 28 terminates the cable conductor. The base of the rod is formed by a ring 29 of a slightly greater diameter than the rod itself, flattened at one side. In the top of the rod is cut a V-shaped slot into which is fitted a flat silver plated tongue 30 so that it lies substantially along the axis of the rod, and a curved

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springy silver plated tongue 31 which touches or almost touches the first tongue towards its tip. The bushing shown in Fig. 7a is internally bored to receive the shape of the rod 28 which will be prevented from rotation with respect to the bushing due to the shape of the ring 29 and its recess in the bushing.

The completely assembled connector is shown in Figures 1 and 2. The sleeve coupling 27 of one termination member screws on to the threaded portion 22 on the outer projection 6 of the other termination member while the sleeve coupling 27 of such second termination member similarly screws over the threaded portion 22 of the outer projection 6 of the first termination member. When the sleeves 27 are each tightly screwed up the cable end of the sleeve comes to bear tightly against the shoulder 26 on the member 24 and the threaded portion 22 of the other terminal is thereby drawn axially inwards towards the shoulder so that the semi-cylindrical shell segments or projections 5, 6 of the two termination members interlock.

At the same time as the interlocking of the inner and outer semi-cylindrical projections is being effected, the inner electric conductor terminal or terminals will be firmly interengaged. In the case of a terminal according to Figs. 3b and 3c the rod 14 of one terminal will be forced into the hollow cylindrical pin 16 of the other terminal and the rod 14 of the second terminal into the hollow cylindrical pin 16 of the first. The stepped portions of the bushings shown in Fig. 3b will also interfit.

In the case of the variation shown in Figs. 4a and 4b the flat tongue 30 of one terminal will be held between the flat tongue 30 and the curved spring tongue 31 of the other terminal and vice versa.

A secure and effective connector is thus obtained which can easily be taken apart again by simply unscrewing the sleeve couplings 27 and pulling the termination members apart. It is not possible to unscrew in error some portion of the termination member instead of the sleeve coupling which is an advantage with a connector of this type. The only other unscrewable portion is the member 24 and this will be locked so long as the sleeves 27 are tightly screwed up.

The sleeves 27 and the member 24 are conveniently knurled to facilitate assembly and disassembly.

I claim:

1. A connector for electric cables of the type comprising two similar interlocking termination members, each termination member comprising a cylindrical insulating bushing having two borings therein to receive the individual conductors of a two conductor cable, one of said conductors having a hollow cylindrical pin extending beyond the end of the other of said conductors, said bushing having an end portion thereof cut away leaving a semi-cylindrical segment, an inner member surrounding said bushing and having an externally threaded cylindrical base portion and two semi-cylindrical tubular projections, the outside radius of one projection being just less than the inside radius of the other projection, said other projection having an external cylindrical surface which is unthreaded except for a region around the free end thereof, an internally threaded cylindrical outer member in threaded engagement with the threads on the base portion of said inner member, said outer member having a shoulder at the end thereof, and an internally threaded

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sleeve coupling on said outer member engageable with said shoulder and extending beyond the end of said outer member so as to surround the unthreaded but not the threaded region of said other tubular projection on said inner member of the termination member and engageable only with the corresponding threaded region of the corresponding tubular projection of the other termination member.

2. A connector for electric cables of the type comprising two similar interlocking termination members, each termination member comprising an element having two parallel conductors extending therefrom, one of said conductors having a female extension for engagement with the male extension of the mating assembly, a cylindrical insulating bushing having two borings therein to receive the parallel conductors, said bushing having an end portion thereof cut away leaving a semi-cylindrical segment which is engageable with the cut away portion of the mating bushing of the other assembly, an inner member surrounding said bushing and having an externally threaded base portion and inner and outer opposing semi-cylindrical tubular projections, the inside radius of the inner projection being just greater than the radius of said bushing and the outside radius of such inner projection being just less than the inside radius of the outer projection, said inner projection of one termination member lying inside the outer projection of the other termination member and forming a cylinder with the inner projection of said other termination member and the outer projection of said first termination member lying outside the inner projection of said other termination member and forming a cylinder with said outer projection of said other termination member when said two termination members are mated, said outer projection of each of said termination members having an external cylindrical surface which is unthreaded except for a region near to the free ends thereof, an internally threaded cylindrical outer member in threaded engagement with the threads on the base portion of said inner member, said outer member having a flange at one end thereof, and an internally threaded sleeve coupling on said outer member engageable with said flange, and extending beyond the end of said outer member so as to surround the unthreaded but not the threaded region of the outer tubular projection on said inner member of the termination member, said threaded coupling of one termination member being engageable only with the threaded region of the outer tubular projection of the other termination member when said two termination members are mated.

3. A connector for electric cables of the type comprising two similar interlocking termination members, each termination member comprising an insulating bushing containing at least one electrical connection terminal for a conductor of an electric cable, an inner member surrounding said bushing and having an externally threaded cylindrical base portion and two axially

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directed semi-cylindrical tubular projections, the outside radius of one projection being just less than the inside radius of the other projection, said other projection having an external cylindrical surface which is unthreaded except for a region near to the free end thereof, an internally threaded cylindrical outer member in threaded engagement with the threads on the base portion of said inner member, said outer member having a shoulder at the end thereof receiving said inner member and an internally threaded sleeve coupling on said outer member and provided with an inwardly directed flange engageable with said shoulder and extending beyond the end of said outer member so as to surround the unthreaded but not the threaded region of the tubular projection on said inner member and engageable only with the corresponding threaded region of the corresponding tubular projection of the other termination member.

4. A termination member for an electric cable connector of the type comprising two similar interlocking termination members and which includes a tubular body structure having cable gripping means at one end and inner and outer oppositely disposed coaxial semi-cylindrical tubular projections at the other end, the outside radius of said inner projection being just less than the inside radius of said outer projection, said outer projection having an external surface which is unthreaded except for a limited region near to the free end thereof, a shoulder around said body structure intermediate said projections and said end having cable gripping means, an insulating bushing within the bore of said body structure, electric terminal means in said bushing and facing the free ends of said projections and an internally threaded sleeve coupling loosely surrounding said body structure, said sleeve coupling being provided with an inwardly directed flange engageable behind said shoulder to position its internal threads surrounding the unthreaded but not the threaded region of said outer projection so as to be engageable with the corresponding threaded region at the free end of the outer projection of a similar termination member to draw the latter axially into tightly clamped engagement.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
599,434	Wilson	Feb. 22, 1898
904,522	Firmin	Nov. 24, 1908
1,975,244	Wiseman	Oct. 2, 1934
2,124,207	Neeson	July 9, 1938
2,125,816	Reynolds	Aug. 2, 1938
2,183,651	Langston et al.	Dec. 19, 1939
2,286,952	Cannon et al.	June 6, 1942
2,386,177	Andersen	Oct. 9, 1945