United States Patent

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[72] Inventors **Yoichi Sugimoto**
625 Domyoji, Fujidera, Osaka;
Shizuhiro Nakata, No. 1043-34, Kujo-cho,
Yamotokoriyama, Nara; Sozo Idomoto, 53-
1, Takakura-cho, 2-chome, Miyakojim-ku,
Osaka, all of, Japan

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[54] **CABLE BRANCH JOINT**
2 Claims, 6 Drawing Figs.

[52] **U.S. Cl.** **174/72,**
174/73, 339/60, 339/94
[51] **Int. Cl.** **H02g 15/08**
[50] **Field of Search** 174/71, 72,
73, 88, 93; 339/60, 61, 94, 143

[56] **References Cited**
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Primary Examiner—Laramie E. Askin
Attorney—Sughrue, Rothwell, Minion, Zinn & Macpeak

ABSTRACT: A cable branching joint of molded insulation having a built-in conductor, which joint is made by molding synthetic rubber or plastic to the outer circumferences of the conductor, inserting cable conductors into the terminals of this molded insulation and covering them with an insertion-type insulation formed of an elastic insulating material like synthetic rubber, which is attachable and detachable and is applicable irrespective of the cable size and the number of branch terminals.

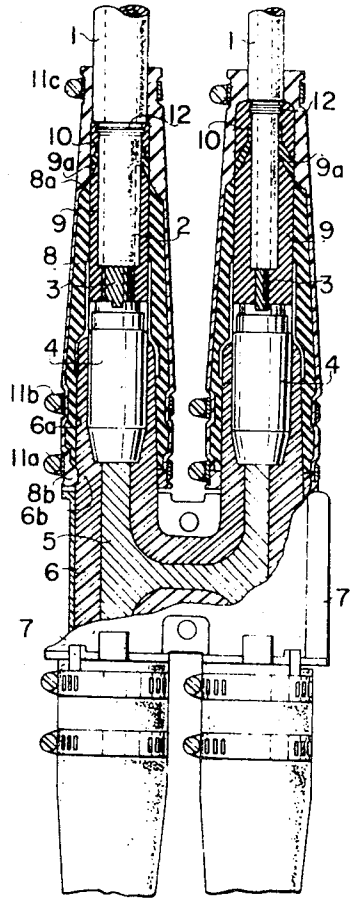


FIG. 1

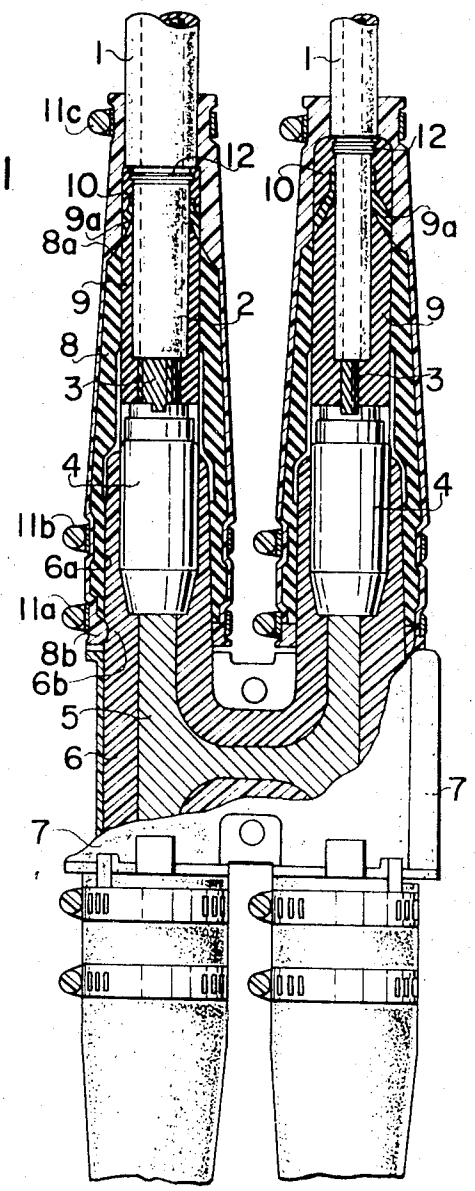


FIG. 2

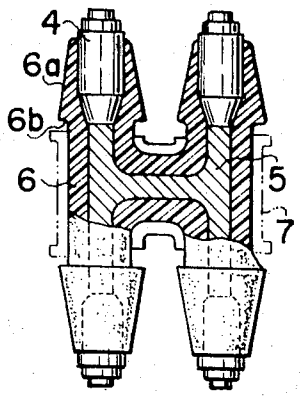


FIG. 3

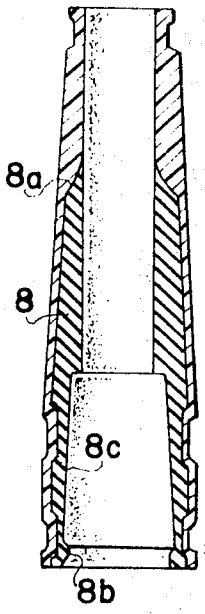


FIG. 6

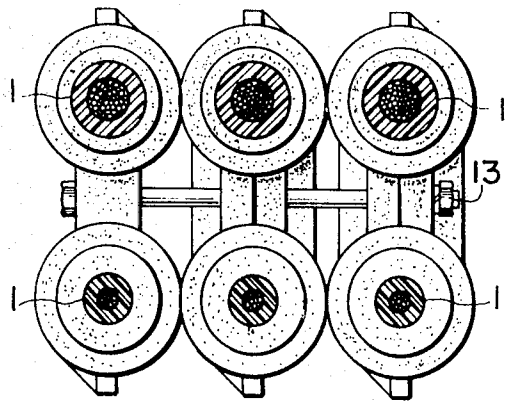
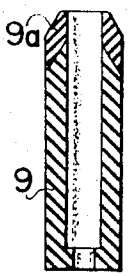


FIG. 4



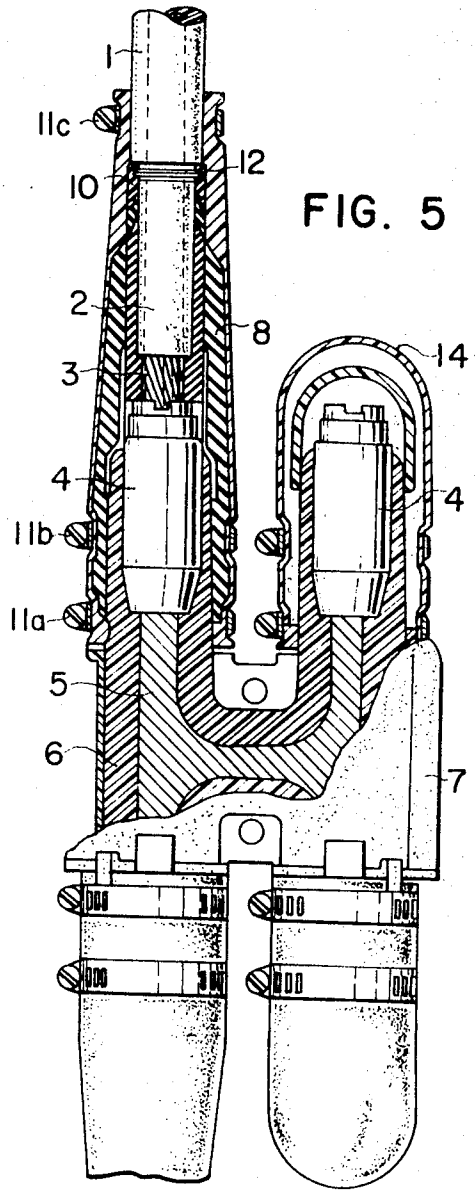


FIG. 5

CABLE BRANCH JOINT

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

This invention relates to an improvement in a branch joint for cables.

The conventional branch joint is made of branching cables housed in a box with bushings connected to their ends. It is therefore large in size. Further, because the insulation was formed of tape, it takes a long time to complete the job. Also, the quality of the work varied greatly depending on variation in the skill of the workman.

The object of the present invention is to remove the above-mentioned drawbacks in a manner explained with reference to an embodiment shown in the drawing.

BRIEF DESCRIPTION OF DRAWINGS

FIG. 1 is a sectional view of a joint representing an embodiment of the present invention.

FIG. 2 is a sectional view of a part of the molded insulation used in this invention.

FIG. 3 is an enlarged sectional view of the insulation cylinder used in the invention.

FIG. 4 is a sectional view of the spacer used in the invention.

FIG. 5 is a sectional view of an embodiment in which a blind lid is provided for a termination not in use.

FIG. 6 is a front view of the assembly of branch joints with each phase assembled.

DETAILED DESCRIPTION OF INVENTION

In FIG. 1, 1 denotes the cables to be joined, 2 the insulation of the cables, 3 the conductors of the cables, 4 metal connectors for the conductors, and 5 H-shaped branch metal fitting connected in one body with said metal connectors 4. Numeral 6 is a molded insulation made of synthetic rubber, plastic, or epoxy resin or the like, and, as shown in FIG. 2, is provided with a suitably tapered part 6*a* at each end which is molded so as to cover the metal conductor-connectors 4 and the branch metal fitting 5. Numeral 7 is a protective cover for the above-mentioned insulation 6 and 8 is an insulating cylinder for the purpose of electrically and mechanically protecting the conductors 3 and metal conductor-connectors 4. The insulating cylinder 8 is made of an elastic insulating material like synthetic rubber having high weather-resistant and insulating properties, and, as shown in FIG. 3, has a tapered part 8*c* fitting the taper 6*a* of the insulation 6 at one end and a stress cone 8*a* molded of a semiconductive rubber or the like for the purpose of reducing the electric field at the end of the shielding. Numeral 9 is a spacer made of the same insulating and semiconductive rubber as the insulating cylinder 8. As shown in FIG. 4, the spacer 9 has an outer diameter that fits the inner diameter of the insulating cylinder, and an inner diameter that fits the outer diameter of the cable insulation 2. The spacer 9 is placed over the cable insulation 2 to fill the gap between the insulating cylinder 8 and the cable insulation 2, and, in addition, it has a stress cone 9*a* which serves to reduce the electric field at the shielding tape 10 secured thereto.

The procedure for making the joint of the aforementioned construction will now be explained. First, the cable 1 is stripped to expose the conductor 3 and insulation 2, and the insulating cylinder 8 is placed around the cable 1. Then, silicone grease or a like insulation lubricator is applied to the cable insulation 2 and the spacer 9 is placed thereon. The conductors 3 are inserted into the metal conductor-connectors 4 and connected by wedge squeezing or compressing or the like. An insulation lubricant such as silicone grease is then applied to the tapered part 6*a* of the molded insulation 6 and the surface of the spacer 9, and the insulating cylinder 8 is placed in the prescribed position. The protruding part 8*b* at the end of the insulating cylinder 8 and the concave part 6*b* of the molded insulation 6 are coupled together and the outer circumference of the insulating cylinder 8 tightened by means of a tightening band 11*a*, whereby movement of the insulating cylinder 8 in the axial direction is prevented. Also, by tightening the molded insulation 6 and the tapered part of the insulating cylinder 8 by means of the tightening band 11*b*, the waterproof and insulating properties of the contact interface is improved still further. The end portion 9*a* on the shielding side of the spacer 9 is wrapped with a conductive tape 10 along with the shielding layer 12 of the cable for both the purpose of conducting the potential of the shielding and the purpose of waterproofing and protecting. The cable sheath 1 is tightened with a tightening band 11*c* at the end part of the insulating cylinder 8 to make its watertightness still more effective.

The foregoing explanation is of an embodiment referred to as a single phase joint. For a three-phase hookup, the jointing operation is made independently for each phase and, after jointing, the joints for the three phases are fastened together by means of a bolt 13 as shown in FIG. 6. In this way the joints can be assembled very compactly.

The aforementioned embodiment is referred to as a four-limb branching, i.e. an X-branch. Needless to say, however, a compact, simple and dependable jointing can likewise be done in the case of linear jointing, Y-branching and also polybranch jointing. Any terminal which is not in use can be stoppered with an insulating cylinder 8 provided with a blind lid 14 as shown in FIG. 5.

As already mentioned, insulating cylinders of one kind of inner diameter are provided according to this invention and these insulating cylinders can be used commonly for different sizes of cables, because it is necessary only to change the spacer depending on the size of the cable. On the other hand, in the case of an insertion-type molded stress cone-type construction for close contact with the cable insulation, it is necessary to previously place the cylinder around the sheath for the purpose of jointing the conductors, and it is necessary to strip off the sheath resulting in the unavoidable necessity of repairing the sheath to complete the jointing. However, if the outer diameter is suitably chosen to be larger than the outer diameter of the sheath, it will not be necessary to strip the sheath but rather the insulating cylinder can easily be placed on the sheath. This shortens the time required for the operation and greatly simplifies it. Thus, the joint of the present invention has advantages such as simplicity of operation, no variation in the results due to variations in skill, and the joint can be made very compact.

We claim:

1. A cable branching joint comprising:
   - a conductive fitting including branches tapering inwardly at their ends,
   - an insulating member molded about said conductive fitting,
   - a cable having insulation surrounding an inner conductor,
   - a metal connector axially coupling at least one cable conductor to a branch of said fitting,
   - an insertion-type insulating cylinder formed of an elastic insulating material concentrically surrounding said insulating member, said connector and said cable,
   - a cylindrical spacer between said cable insulation and a portion of said cylinder and a first stress cone on the insertion end of said insulating cylinder and a second stress cone provided along an end of said spacer.

2. The cable branching joint as claimed in claim 1, further comprising tightening band overlying said insulating cylinder, said molded insulation member and said metal connector for sealing one end of said branch joint, and an additional tightening band overlying said insulating cylinder at the opposite end thereof for sealing said cylinder to said cable insulation.