

March 12, 1946.

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2,396,283

METHOD OF TERMINATING HIGH TENSION CABLES

Filed May 19, 1942

FIG. 1.

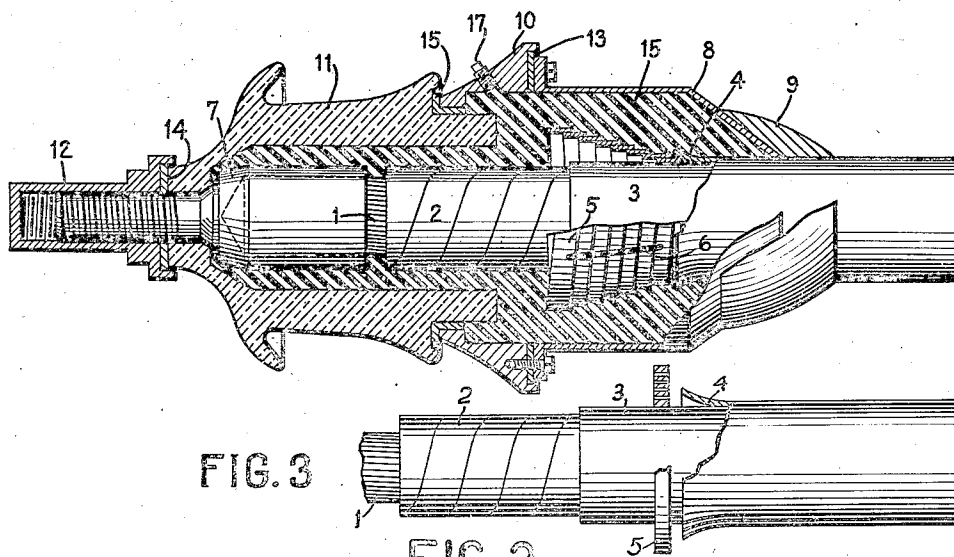
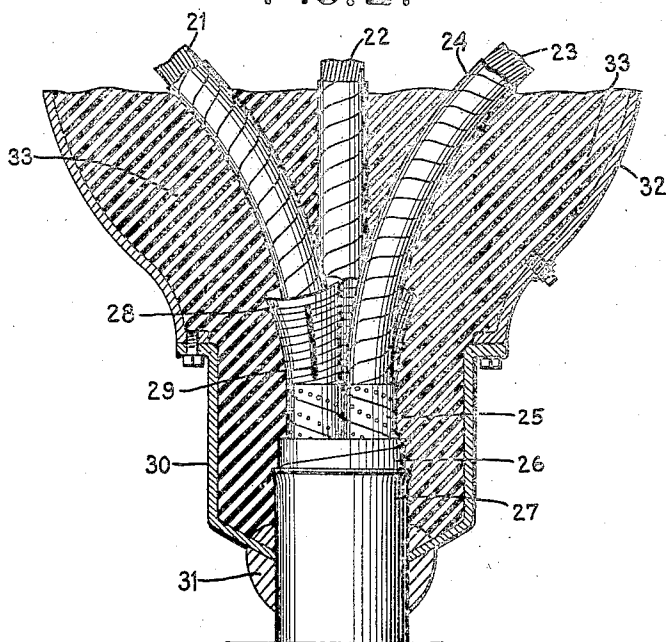


FIG. 2.



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2,396,283

METHOD OF TERMINATING HIGH-TENSION CABLES

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Application May 19, 1942, Serial No. 443,589

5 Claims. (Cl. 29—155.5)

This invention relates to stress cones for high tension electric cables and to terminals and joints comprising stress cones.

In high tension electric cables comprising an inner conductor surrounded by one or more layers of insulating material and an outer metallic covering or sheath of, for example, copper, lead, or bronze, it has been found that at terminals, joints, pothead, or other points where the metallic covering or sheath terminates, a concentration of flux occurs in the dielectric which may give rise to breakdown or leakage in the insulation. It has been proposed to provide at such a point a stress cone consisting of a funnel shaped metallic member seated on the end of the metallic sheath or cover and having its apex welded or otherwise electrically connected to the end of the sheath. By this means the potential across the dielectric is uniformly graded, and concentration of flux in the dielectric where the sheath terminates is avoided.

Such stress cones have in the past been formed of sheet or spun metal. Since the angle of flare or divergence is determined by rather involved mathematical laws and varies according to the voltage to be carried by the cable, the nature and thickness of the insulation, etc., it has been necessary to keep in stock many differently dimensioned cones. Moreover, since the narrow end of the cone is required to be a close fit over the insulation surrounding the conductor, difficulty is often experienced in applying the cone to the cable end.

It is an object of the present invention to provide a method of terminating high tension cables comprising a roll of metallic tape which is slipped over the insulated conductor, the inner convolution or layer then being spiralled out to underlap the metallic shielding tape over the conductor insulation in the case of a multiconductor cable, or to underlap the metallic covering or sheath in the case of a metal sheathed, insulated single conductor cable. The roll of metallic tape is then twisted to tightness and the convolutions or layers displaced to form a spiralled cone. One or more seams of solder may then be run down the outer conical surface to secure the spiral roll in its conical shape and prevent it from becoming unwound.

The principle of my invention may be more fully understood from the following description made with reference to the accompanying drawing illustrating two structural embodiments of potheads provided with stress grading cones according to my invention, in which Fig. 1 is a side

elevation partly in section of a pothead for a single conductor cable comprising a stress grading cone in accordance with my invention, and Fig. 2 is a side elevation partly in section of the base of a pothead for a multiconductor cable in which a stress cone is associated with each conductor in accordance with my invention. Fig. 3 is a side elevation partly in section of a pothead for a single conducting cable showing one particular step in the method.

The method of assembling a stress cone and pothead at the end of a single conductor cable will first be described with reference to Fig. 1.

The lead sheath is first removed from the end of the cable, and by means of a suitable tool the end of the lead sheath 4 where it has been cut off, is slightly belled out. The rubber hose jacket 3 is then removed from the end of the cable up to a point a short distance before the end of the lead sheath 4, and finally the shielding tape 2 is removed to a short distance to bare a short length of the stranded conductor 1. The end of the stranded conductor 1 is then thoroughly tinned and soldered into the bore of a stem 7. A wiping nipple 8 is slipped over the end of the cable sheath 4.

A roll of copper or metallized tape, the inner diameter of which is slightly larger than the diameter of the rubber hose jacket 3, is now slipped over the end of the cable as a roll as indicated in Fig. 3. The inner layer or convolution of the roll is then spiralled out to underlap the lead sheath 4 over the hose jacket 3, as shown in Fig. 1. The roll of tape is then twisted to tightness and the layers displaced by extending the roll to form a spiralled cone having the desired angle of divergence. One or more seams of solder 6 are run down the outer conical surface to secure the spiral roll and prevent it from unwinding.

The porcelain insulator 11 secured to the cap 10 by means of a suitable cement 15 is now slipped over the end of the cable and bolted to wiping nipple 8, a gasket 13 being interposed between the cap 10 and the wiping nipple 8. A wiped joint 9 is made between the wiping nipple 8 and the cable sheath 4 in the usual manner. A hood nut 12 is then screwed onto the stem 7, a gasket 14 being interposed between the two last-mentioned parts. The space inside the pothead and inside the stress cone 5 is filled with any suitable filling compound which is introduced through an opening afterwards closed by the plug nut 17. The filling compound may, for example, comprise styrene which may be introduced in monomeric form and polymerized in accordance with the

method disclosed in United States Patents Nos. 2,209,894 and 2,209,895.

Fig. 2 illustrates how a stress cone according to the invention may be applied to each of the conductors of a three-conductor cable in a bell-shaped pothead of known construction.

The lead sheath 27 is first removed from the end of the cable and the end where it has been cut off is slightly flared out with a suitable tool. The cable binding tape 26 is then removed up to a short distance from the end of the lead sheath and the metallic shielding tape 25 is removed from the individual conductors 21, 22, 23 to a point a short distance above the point where the cable binding tape terminates. After the wiping nipple 30 has been slipped over the cable the individual insulated conductors are fanned out into approximately final position, avoiding sharp bends or damage to the cable insulation. Each of the conductors is now provided with a stress cone 28 which consists of a roll of metal tape which is slipped over the insulated conductor. The inner layer of each roll is spiralled out to underlap the metallic cable shielding tape 25. The roll of tape is then twisted to tightness and the layers displaced to form the spiralled cone 28. As in the stress cone of Fig. 1, one or more seams of solder 29 is run down the outer conical surface of each cone to prevent it from unwinding.

The pothead bell 32 is bolted to the wiping nipple 30 and the end of the wiping nipple is secured to the cable sheath 27 by a wiped joint 31. The inside of the bell 32 and the wiping nipple 30 is filled with a filling compound 33 of any suitable kind, such as polymerizable styrene. The filling compound enters and fills the interior of the stress cones 28.

Although the invention has been described with reference to potheads for single and multiconductor cables, it will be understood that stress cones according to the invention may be used in association with cable joints, barriers, bushings, and at any other points in a cable where a metallic sheath is terminated and a concentration of flux tends to build up in the dielectric.

What I claim is:

1. Method of terminating a high tension cable comprising a conductor and at least one layer of insulating material covered by an outer metallic cover, which consists in slipping a roll of metallic tape over said insulating covering, spiralling out the inner convolution of said roll and inserting the edge thereof between said insulating

layer and said metallic cover so as to make electrical contact with said metallic cover at the point where the latter terminates, extending said roll to form a lapped tape and tightening said roll to form a metal cone, whereby concentration of dielectric stress at the termination of said cable is greatly reduced.

2. Method of terminating a high tension cable comprising a conductor surrounded by at least one layer of insulating material and an outer metallic cover, which consists in slipping a roll of metallic tape over said insulating covering, spiralling out the inner convolution of said roll, and causing the edge thereof to make electrical contact with said metallic cover at the point where the latter terminates, extending the outer convolutions of said tape to form a tube of lapped tape and tightening said roll to form a metal cone, whereby undue concentration of dielectric stress at the termination of said cable is avoided.

3. Method of terminating a high tension cable according to claim 2, comprising the further step of running at least one line of solder down the outside surface of said cone to prevent the turns from unwinding.

4. Method of terminating an electric cable having at least one metallic covering thereof, comprising slipping a roll of metallic tape over the cable, spiralling out the inner layer of the roll to embrace the cable and to make electrical contact with said metal covering, and extending and twisting the outer layers of the roll to form a cone of lapped metallic tape, whereby a stress cone substantially preventing undue dielectric stress, is formed at the termination of said cable.

5. Method of terminating a high tension cable comprising a conductor surrounded by at least one layer of insulating material and an outer metallic cover, which consists in slipping a roll of metallic tape over said insulating covering, spiralling out the inner convolution of said roll, and causing the edge thereof to make electrical contact with said metallic cover at the point where the latter terminates extending the outer convolutions of said tape to form a tube of lapped tape, tightening said roll so as to form a metallic stress-reducing cone, applying mechanical means to retain the shape of said cone, and filling the inside of said cone with an insulating filling compound, whereby reduction of undue concentration of dielectric stress at the termination of said cable is secured.

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