Oct. 15, 1935. R. C. WALDRON 2,017,519

TERMINAL INSULATOR

Filed April 11, 1932

Fig. 1.

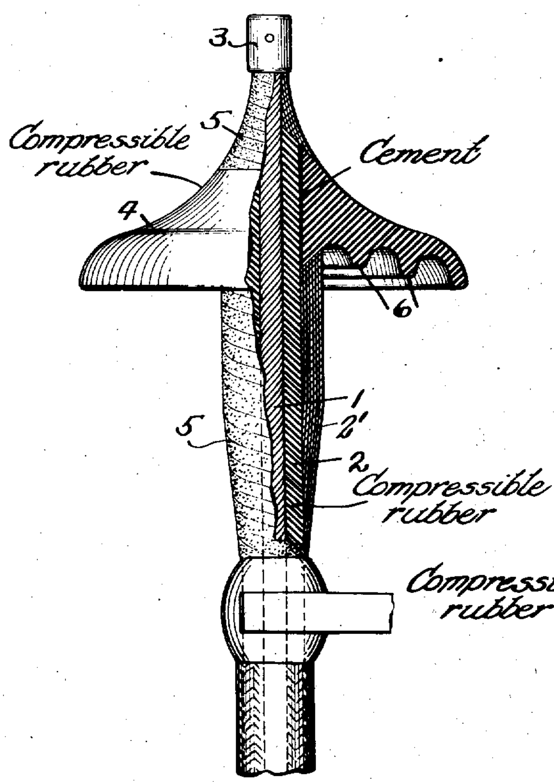


Fig. 3.

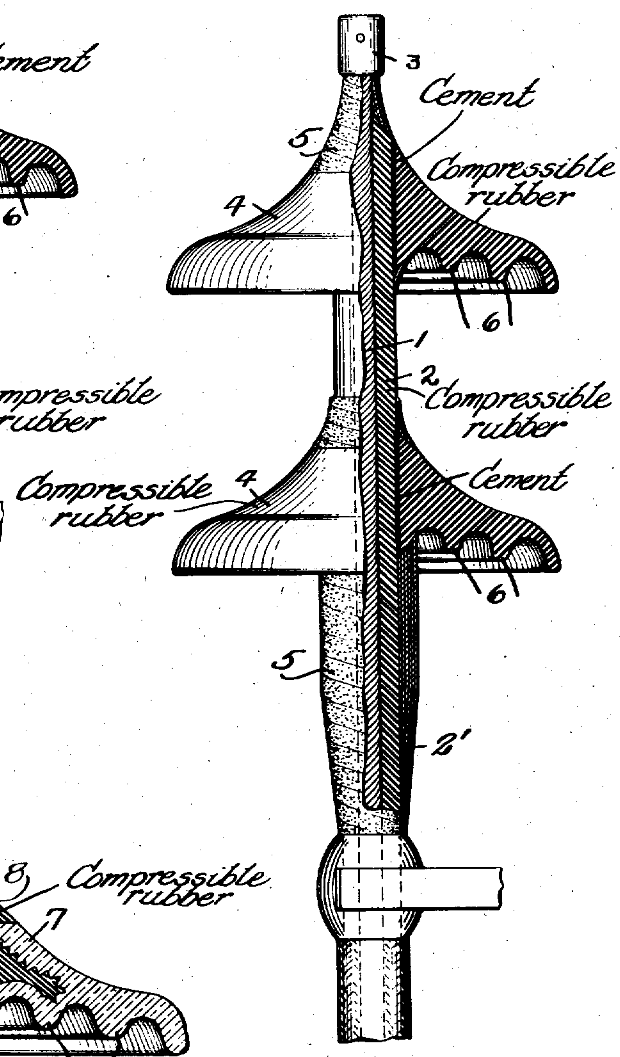
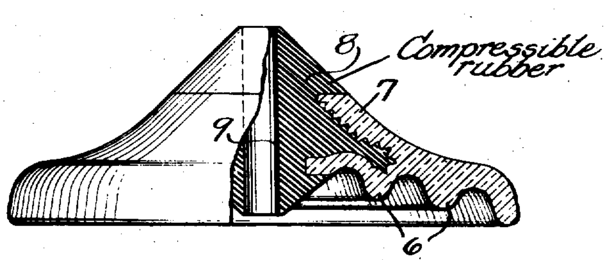


Fig. 2.



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TERMINAL INSULATOR

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4 Claims. (Cl. 173—353)

My invention relates to the provision of a terminal insulator of improved construction and particularly adapted for use in connection with the installation of rubber insulated cables.

Rubber insulated cables for high voltages require some arrangement to prevent flashover from the conductor to the cable sheath or braid. When dealing with low voltages it is usually sufficient to remove the sheath or braid for a short distance but this method cannot be used when dealing with high voltages due to the excessive leakage which will occur along the surface of the insulation. This leakage is greatest when the cable is wet and dirty and under these conditions the cable is liable to flashover and interrupt the circuit.

It is common practice to install potheads on the cable. These are usually of porcelain for insulating purposes fitted with a base and the necessary terminal fittings. The cable is placed inside the pothead and the pothead filled with an insulating compound to prevent electrical failure. From an operating standpoint these potheads are satisfactory but their cost and the labor of installing is often excessive and to some extent prohibitive. As a matter of fact in short length cables such as from a generator to outdoor switches or transformers the cost of such potheads for terminating the cable may be as high as the entire cost of the cable itself.

The present invention provides an improved type of insulator adapted to be used in place of potheads in which the required safety from flashovers is maintained.

In the accompanying drawing I have shown different embodiments of my invention.

Fig. 1 is a part sectional elevational view of a single conductor cable with my improved structure applied thereto;

Fig. 2 is a similar view of a modified form of my invention; while

Fig. 3 is a part sectional elevational view of a terminal insulator having a higher flashover value than the form shown in Fig. 1, for instance.

Referring to the drawing in detail and first of all to Fig. 1, 1 designates the conductor of a single conductor cable, this conductor being insulated with an insulating medium 2 usually rubber compound but as a matter of fact any compressible composition. As is customary the end of the cable 1 is sweated into a terminal lug 3. The insulator or protective means 4 is then slipped into place as shown.

The insulator 4 is molded from an elastic composition such as the rubber compound employed as the insulation of the cable and the center hole of the insulator is made slightly smaller than the outside of the cable. Inasmuch as the insulation 2 of the cable and the material of the insulator 4 are compressible there will be perfect contact between the insulation 2 and the insulator when the insulator is forced into place.

To exclude air and to obtain a permanent bond cement is applied to these surfaces before they are fitted together and to still further increase the electrical strength of this path insulating tape shown at 5 is applied about the cable at the top and bottom of the insulator 4.

If voltage is now applied between the lug 3 and the sheath 2' of the cable, which as usual is grounded, the only leakage paths are along the surface of the insulator 4 or between the insulator and the original insulation 2.

By a construction such as above described the strength of the latter path may be made greater than the air leakage path along the surface of the insulation 2. This leakage path is increased by ribs 6 on the bottom of the insulator 4 so that the leakage path along the bottom or under surface of the insulator to the grounded sheath 2' is stronger than the flashover through the air, whereby in the event of breakdown the discharge follows a path remote from the lower surface of the insulator. It is evident that this flashover value may be varied by controlling the dimensions of the insulator.

For outdoor use the wet flashover values such as would be obtained during a rainstorm must be considered and in my invention the flashover is maintained high by the ribs 6 above described.

A comparison of the flashover values obtained with my insulator and with a plain cable end with no insulator will be of interest.

		Flashover in K. V.	
		Wet	Dry
Insulator	6" from lug 3 to cable sheath	45	85
No insulator	3" from lug 3 to cable sheath	15	30
	6" from lug 3 to cable sheath	25	40
	12" from lug 3 to cable sheath	35	55
	16" from lug 3 to cable sheath	40	60

The above table shows the saving in the leakage distance which may be obtained by the use of my insulator.

After the cables have been in service for some time the flashover for the plain cables would decrease due to the collection of dirt while the

insulator value will not decrease due to the leakage path being for the most part along the bottom where dirt will not collect.

Another form of my invention is shown in Fig. 2. In this form of my invention the insulator 4 is in the nature of a shell 7 made of suitable insulating material such as porcelain. This is provided with a central portion 8 of material similar to the insulator 4, that is to say, a compressible composition and it is to be understood that this insulator is to be slipped over the cable in the same fashion as described in connection with Fig. 1, the hole 9 being slightly smaller than the outside of the cable to which the device is to be applied.

The flashover voltage may be increased by using a glazed surface for the outer shell but in order to form a satisfactory seal over the cable end the center portion must be elastic. The shell 7 may be cut thick as shown or may be very thin and the elastic center 8 may be molded into the shell or the shell may be applied to the previously manufactured center 8 as by painting.

In Fig. 3 I have shown a construction in which two insulators 4 are employed, these insulators being of the same construction as described in connection with Fig. 1. This plurality of insulators is employed for increasing the flashover value of the installation and two or even more insulators may be employed on a single cable if desired.

It will be seen from the foregoing that my invention provides an insulator for terminal cables wherein the cable is insulated with a compressible composition in which the insulator has a center of compressible composition or it may be of compressible composition throughout, the hole in the insulator which permits of the insulator being applied to the cable being of smaller diameter than the outside of the cable so as to snugly fit the same and perfect contact is provided by reason of this fact and by reason of the fact that the insulation and the insulator are of elastic material.

What I claim is—

1. In combination a high voltage power cable comprising a compressible-rubber insulated single conductor having a terminal at one end and a grounded means spaced from said terminal end, a protective means comprising a terminal insulator having a bore therethrough receiving the insulation of the conductor, the inside diameter of said bore before assembly being smaller than the outside diameter of the rubber insulation of the conductor, thereby eliminating air pockets and reducing electrical leakage along the area of contact between the cable insulation and the bore of the insulator by maintaining intimate contact between the rubber insulation of the cable and the insulator, the leakage path along the under surface of the insulator to said grounded means being stronger than the flashover through the air, whereby in the event of breakdown the discharge follows a path remote from the lower surface of the insulator.

2. In combination a high voltage power cable comprising a single conductor and an outer covering of compressible-rubber insulating material for the conductor, said cable having a terminal at one end and grounded means spaced from said terminal end, a protective means comprising a terminal insulator having a bore therethrough receiving the conductor insulation, the walls of the bore in the insulator being of the same compressible-rubber insulating material as the said outer covering of the cable and stretched over the insulation of the cable conductor so as to be under compression thereby eliminating air pockets and reducing electrical leakage along the area of contact between the cable insulation and the walls of the bore of the insulator by maintaining intimate contact between the rubber insulation of the cable and the rubber walls of the insulator bore, the leakage path along the under surface of the insulator to said grounded means being stronger than the flashover through the air, whereby in the event of breakdown the discharge follows a path remote from the lower surface of the insulator.

3. In combination a high voltage power cable comprising a single conductor insulated with compressible-rubber insulation and having a terminal at one end and grounded means spaced from said terminal end, a protective means comprising a terminal insulator having a longitudinal bore therethrough which receives the conductor insulation, the walls of said bore being of compressible rubber and stretched over the insulation of the cable conductor, thereby eliminating air pockets and reducing electrical leakage along the area of contact between the cable insulation and the bore of the insulator by maintaining intimate contact between the cable insulation and the walls of the insulator bore, cement for bonding the insulator and the insulating covering of the cable, insulating tape about the insulation of the cable and the sides of the insulator forming an additional dielectric to prevent electrical leakage along the area of contact between the cable insulation and the insulator bore, the leakage path along the under surface of the insulator to said grounded means being stronger than the flashover through the air, whereby in the event of breakdown the discharge follows a path remote from the lower surface of the insulator.

4. In combination a high voltage power cable comprising a single conductor, compressible-rubber insulation for the conductor, said cable having a terminal at one end and grounded means spaced from said terminal end, a protective means comprising a terminal insulator of the same material as the said cable insulation and having a bore therethrough receiving the conductor insulation, said insulator being stretched over the insulating material of the cable, thereby to maintain intimate contact between the insulator and the insulation of the conductor, cement for bonding the insulator and the insulating covering of the cable and for excluding gas and air from between the insulator and the cable insulation received by the insulator, the leakage path along the under surface of the insulator to said grounded means being stronger than the flashover through the air, whereby in the event of breakdown the discharge follows a path remote from the lower surface of the insulator.

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