ELECTRICAL INSULATOR CONTAMINATION SHIELD

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Filed May 7, 1957, Ser. No. 657,654

2 Claims. (Cl. 174—139)

This invention relates to improvements in electrical insulators and more particularly to shields for protecting insulator surfaces against contamination from dust and sand particles, chemical deposits such as salt, and moisture such as fog.

Considerable damage to electric power transmission lines has been caused by insulator flashovers and pole fires resulting from contamination of insulator surfaces especially in areas along the Gulf Coast where the atmosphere contains salty moisture and some crude petroleum mixed with sand which is blown against and forms deposits on electric poles, insulators and cross-arms.

Attempts have been made to solve the problem of insulator contamination in some instances by subjecting the insulator surfaces to periodic washing, abrasive blasting, by replacement of the insulators themselves or by the use of smooth protective coatings intended to reduce surface deposits. In other instances, oversized insulators have been used to the end that their effectiveness on contamination will approximate that of clean, normal-size insulators. These methods have not been completely successful under adverse conditions and moreover are objectionable from an economic standpoint in that they materially increase the cost of transmission of electric energy.

The primary object of the present invention is to provide means for protecting electrical insulators from surface contamination in an effective and economically feasible manner.

Another important object of the invention is the provision of contamination shields that are readily applicable to electric insulators already in use on transmission lines.

Other objects and advantages of the invention will become apparent during the course of the following detailed description taken in connection with the accompanying drawings forming a part of the specification and in which drawing,

Fig. 1 is a view in side elevation of an electric insulator and showing the application of one segment of a two-segment insulator shield thereto.

Fig. 2 is a horizontal sectional view of the insulator shield of Fig. 1, the view being taken substantially on the line 2—2 of Fig. 3.

Fig. 3 is a side elevational view of the insulator shield shown in Figs. 1 and 2.

Fig. 4 is a view in side elevational of a two-unit string of suspension insulators and showing the application of one segment of a two-segment insulator shield thereto.

Fig. 5 is a horizontal cross sectional view of the insulator shield shown in Fig. 4, taken substantially on the line 5—5 of Fig. 4.

Fig. 6 is a fragmentary view partly in elevation and partly in central vertical section of a transformer insulator and contamination shield therefor.

In the drawing which for the purpose of illustration shows modified forms of the invention, and wherein like reference characters denote corresponding parts throughout the views, the numeral 10 generally designates a contamination shield suitable for application to a flanged insulator 11 equipped with downwardly extending supporting hardware 12 in its base 13 and provided with an annular groove 14 at its upper end 15.

Referring to Figs. 1—3 the contamination shield 10 comprises two segmental halves 16, 17 that are releasably secured together along a longitudinal plane 18 by any suitable snap fastening means 19 which in the example shown is of the ball and socket type. The segments or halves 16, 17 are formed of a thin smooth insulative weather-resistant plastic such as acrylic resin and are shaped to jointly provide a skirt or shell 20 having an inturnd annular top flange portion 21 dimensioned for engagement with the upper end portion 15 of the insulator 11 by seating in the annular groove 14 therein. The skirt or shell 20 also has a generally cylindrical side portion 22 dimensioned to encircle the insulator in spaced relation thereto so as to define an annular gap 23 at the lower end portion or base 13 of the insulator, and an inturnd annular bottom flange portion 24 spaced below the insulator 11 and adapted to define a gap 25 relative to the bottom end portion of the insulator and a similar length gap 26 relative to the insulator hardware 12. In use of the shield, its bottom flange portion 24 serves as a baffle which tends to prevent the flow of contaminate particles and gases toward the insulator from below.

For the various sizes of insulators these shields will vary in size in accordance with the physical dimensions of the insulator and the necessary clearance from conducting or grounded hardware as required by the National Electrical Manufacturers Association standards for lightning gaps at the applied voltage. For example, at 7.2 kv, the gaps 23, 25 and 26 should be 5/16".

In Figs. 4 and 5 is shown a contamination shield 10A for a two-unit string suspension insulator 27 and this shield 10A is like the previously described contamination shield 10 of Figs. 1—3 in its construction and application except that it has a generally spherical or convex side portion 28 instead of the generally cylindrical side portion 22 of the form shown in Figs. 1—3.

Referring now to Fig. 6 there is shown a transformer bushing 30 which extends through the transformer cover 31 and is equipped with an insulator 32 provided at its upper end 33 with an annular groove 34 and the contamination shield 10B mounted in this groove is the same as the previously described shield 10 shown in Figs. 1—3 except for increased clearance around the insulator 32 and the omission of the inturnd bottom flange portion 24 of Figs. 1—3. Instead of the latter, there is mounted on the transformer cover 31 and secured in coaxial alignment with the insulator 32 and bushing 30 by an annular retainer 35, a cylindrical sleeve 36 of the same material as the previously described shield 10 and of a diameter intermediate the diameters of the transformer insulator 32 and of the transformer shlde member 10B, providing suitable gaps between the conducting and grounded parts.

In tests of these contamination shields around insulators in an area where extensive damage was being experienced due to pole fires caused by unprotected contaminated insulators, no pole fires or flashovers were observed, even under the most adverse conditions where these shields were in use.

Various changes may be made in the forms of invention herein shown and described without departing from the spirit of the invention or the scope of the following claims.

What is claimed is:

1. A contamination shield for an electrical insulator equipped with normally downwardly extending supporting hardware in its base comprising a plurality of longitudinal segments and releasable means snapping said seg-
ments together, said segments being formed of smooth insulative material and shaped to jointly provide a skirt having an inturned annular top portion for engagement with the upper end portion of the insulator, a generally cylindrical side portion encircling the insulator in spaced relation and an inturned annular bottom portion spaced from the insulator and defining a gap relative to the insulator hardware, said gap having a clearance selected as necessary for lightning gaps at the applied voltage.

2. A contamination shield for an electrical insulator equipped with normally downwardly extending supporting hardware in its base comprising two longitudinal half segments equipped with snap means releasably securing the half segments together, said segments being formed of thin smooth insulative weather-resistant plastic and shaped to jointly provide a skirt having an inturned annular top portion dimensioned for engagement with the upper end portion of the insulator, a generally spherical or convex side portion dimensioned to encircle the insulator in spaced relation thereto, and an inturned annular bottom portion spaced below the insulator to define a gap relative to the insulator hardware and serving to inhibit the flow of dust particles and gases toward the insulator from below, said gap having a clearance selected as necessary for lightning gaps at the applied voltage.

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