Nov. 8, 1938. P. J. BOTT 2,135,558

INSULATOR SHIELD

Filed March 7, 1938

Fig. 1

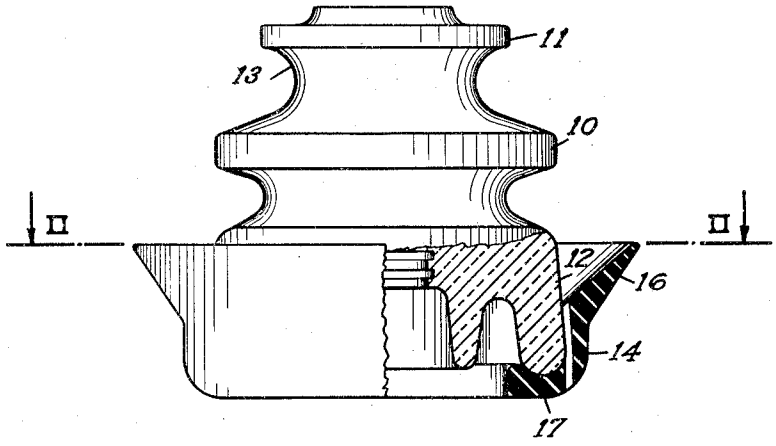
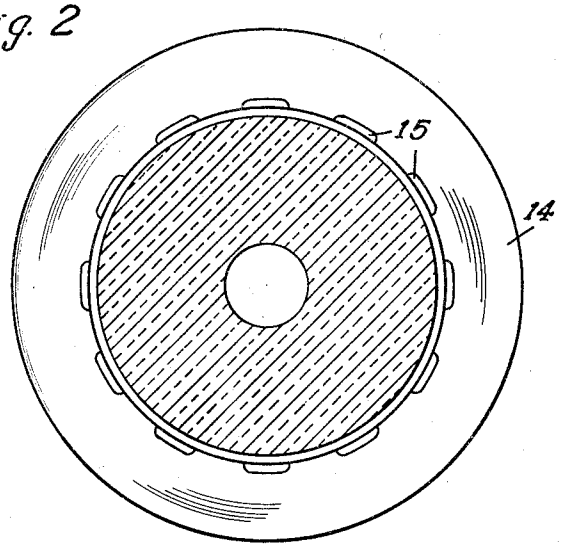


Fig. 2



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INSULATOR SHIELD

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6 Claims. (Cl. 173—28)

This invention relates generally to insulator shields or guards, and particularly to shields for the purpose of protecting insulators of the pin type from damage due to impact of missiles or like objects directed at the insulator.

Particularly with respect to high voltage electric power lines, the breakage of an insulator through malicious mischief not only may interrupt the supply of electrical energy to a considerable number of users, but also, through the burning and consequent falling of a conductor from the insulator, may cause damage to property and be a hazard to life. Heretofore the ruggedness of insulators has been dependent upon the embodiment in their construction of relatively thick porcelain sections. Such insulators are of inferior quality electrically as compared to those of thinner sections, and are also more expensive, especially in voltage ratings such as 13 to 23 kilo-volts. In addition, even the thick porcelain sections may readily be fractured by a suitably directed stone or similar object.

The principal object of the present invention is the provision of a shield which effectively absorbs the impact due to an object directed toward an insulator of porcelain or other frangible material so as to prevent the transmission of any substantial impact force to the insulator, to thereby prevent breakage or fracture of the latter.

Another object is the provision of means for supporting such an impact-absorbing shield through frictional engagement of the shield with the lower downwardly and outwardly extending petticoat portion of the insulator.

A further object is the provision of means whereby washing of the insulator by rain-water may be accomplished while the shield is supported as above described.

These and other objects will be apparent from the following description and claims taken in connection with the accompanying drawing forming a part of this application, in which—

Fig. 1 is an elevational view of the shield in the service position, shown partly in section, and Fig. 2 is a sectional view on the line II—II of Fig. 1.

As illustrated, the hollow cup-shaped body portion of the shield 14 is fitted over the downwardly and outwardly extending petticoat 12 of the insulator 10. The latter is of porcelain or other easily fractured insulating material, and of a type commonly used for insulatingly supporting electric power conductors, being of the well-known design which includes the head 11 and the tie wire groove 13. The outer surface of the petticoat portion 12 is commonly smooth but frusto-conical in outline, and the latter feature assists in retaining the shield in place on the insulator, but it may be observed that insulators of other shape may be so equipped provided sufficient taper is present to support the shield.

The shield 14 is formed from some elastic insulating material which is relatively deformable in comparison with the material of the insulator 10, such as rubber or rubber compounds or substitutes. The general shape is that of a hollow substantially cylindrical body which is provided at the upper end with an integral outwardly flaring flange portion 16, and at the lower end with an integral inwardly extending flange 17. The internal diameter of the shield is preferably slightly less than that of the outside diameter of the lower portion 12 of the insulator 10, and the shield is stretched over the latter so that it is supported on the insulator by frictional engagement therewith.

In service, insulators are commonly mounted near the top of an upstanding pole, considerably above ground level. In such a position, the outwardly extending flange 16 forms an effective protection for the upper portions of the insulator 10 against direct impact of missiles travelling in an upward direction, while the inwardly extending flange 17 similarly protects the lower portions of the insulator.

The surface of the shield 14 adjacent to the insulator 10 is provided with a plurality of vertically extending circumferentially spaced grooves or slots 15, which have a substantially greater width than depth, and which extend from the juncture of the upper flange 16 with the body portion of the shield downwardly for the full remaining length thereof. The grooves 15 perform two functions important to the success of the shield in service; (1) their presence increases the resiliency of the body portion of the shield, so that a thinner wall section may be employed to provide the same degree of protection that a thicker section would provide in their absence, and (2) they provide a drainage for rain water so that the upper portion of the insulator and the upper surface of the flange 16 may be washed during each rainfall on the assembly.

The number and spacing of the grooves 15 is of importance. The total cross-sectional area of the openings provided by the grooves 15 must be such that the rain water intercepted by the flange 16 passes through the openings at a sufficiently rapid rate to prevent water rising to the level of

the top of the flange, in order to prevent a substantial reduction in electrical strength of the insulator. In addition, the area of contact afforded by those portions of the shield with the insulator must be sufficient to effectively retain it in the service position, but not so great as to materially detract from the increased cushioning effect resulting from the grooves.

As a specific example of a shield meeting the above-stated requirements, it has been found that, for a shield protecting an insulator having an outside petticoat diameter of 3¾ inches, twelve grooves are desirable, each ½ inch wide and ⅛ inch deep, the wall section into which the grooves are formed being ¼ inch. Such a shield effectively prevented fracture of insulators from impact blows of sufficient force to shatter the insulators with the first blow in the absence of the shield.

Since the shield **14** is of insulating material, it will be apparent that no reduction in the insulating properties of the insulator results from the application of the shield to the insulator.

From the above description, it will be seen that I have developed a most effective and inexpensive shield particularly adapted for use with pin type insulators having downwardly depending and outwardly flaring petticoats, which can be economically applied to afford a high degree of protection against fracture or breakage.

While I have herein illustrated and described one form of the invention, in order to facilitate an understanding of its construction and application, it will be evident to those skilled in the art that other forms and modifications may be employed without departing from the spirit of this invention as described above or as set forth in the appended claims.

I claim, as my invention:

1. In combination with an insulator having an outwardly flared petticoat portion the surface of which is smooth, a shield of relatively easily deformable resilient material disposed over said portion, said shield being stretched circumferentially over the outer and lower surface of the petticoat portion and being supported thereon through resilient engagement of said shield with said petticoat portion.

2. The combination with an insulator having a lower downwardly and outwardly extending petticoat portion, of a shield of relatively deformable elastic insulating material, comprising in a single piece a hollow body portion stretched over and arranged to embrace said petticoat portion and to be supported thereon through frictional engagement therewith, said body portion having an outwardly and upwardly extending peripheral flange at its upper end and an inwardly extending circular flange at its lower end.

3. The combination with an insulator having a lower downwardly and outwardly extending petticoat portion, of a shield formed in a single piece of relatively deformable elastic insulating material, comprising a hollow cup-shaped body portion stretched over and resiliently engaging said petticoat portion, and an outwardly and upwardly flaring peripheral flange at the upper end of said body portion.

4. The combination with an insulator having an outwardly and downwardly extending petticoat portion, of a shield of relatively deformable elastic insulating material, comprising in a single piece a substantially cylindrical body portion stretched over and frictionally engaging said petticoat portion, said body portion having inwardly and outwardly extending circumferential flanges at the respective ends thereof, and means for increasing the impact-absorbing ability of said shield, said means including a plurality of circumferentially spaced grooves extending parallel to the axis of said cylindrical body portion along the inner wall of said body portion.

5. The combination with an insulator having a lower downwardly and outwardly extending petticoat portion, of a shield of relatively deformable elastic insulating material, comprising in a single piece a hollow body portion stretched over said petticoat portion and to be supported thereon through frictional engagement therewith, said body portion having an outwardly and upwardly extending peripheral flange at its upper end and an inwardly extending flange at its lower end, and a plurality of circumferentially spaced grooves formed in and extending along the inner wall of said body portion from the upper flange through the lower flange, whereby to increase the impact-absorbing ability of said shield.

6. A resilient shield for use with an insulator comprising in a single piece a hollow cylindrical bory portion of relatively deformable elastic insulating material having inwardly and outwardly extending circumferential flanges at the respective ends thereof, the inner surface of said body portion being so formed as to provide a plurality of circumferentially spaced slots between the insulator and the shield, said slots extending from the juncture of the outwardly extending flange with the body portion toward and through the inwardly extending flange, the circumferential width of said slots being substantially greater than the radial depth thereof, whereby the impact-absorbing ability of the shield is increased.

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