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INSULATOR

Filed July 1, 1925

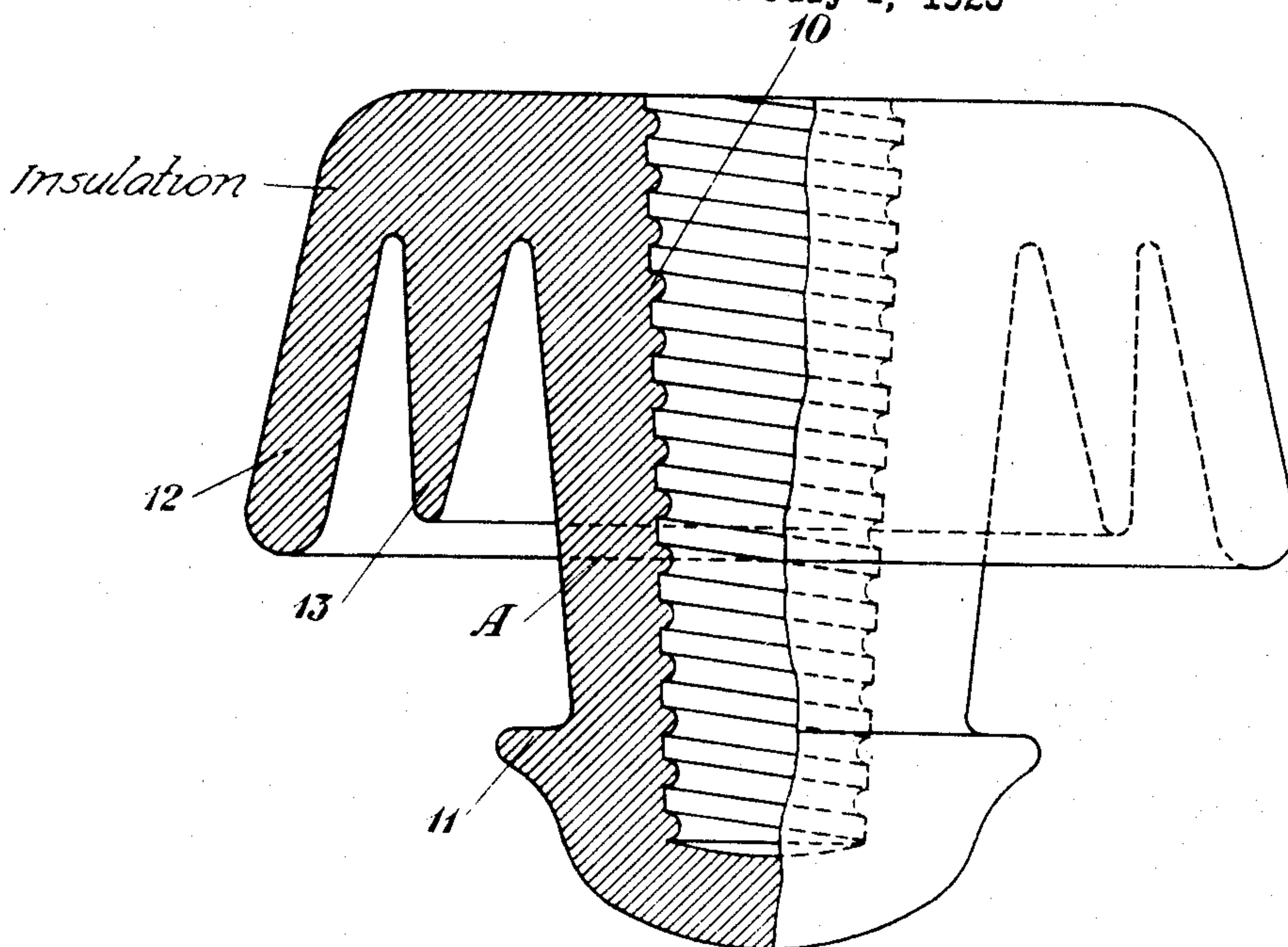


Fig. 1

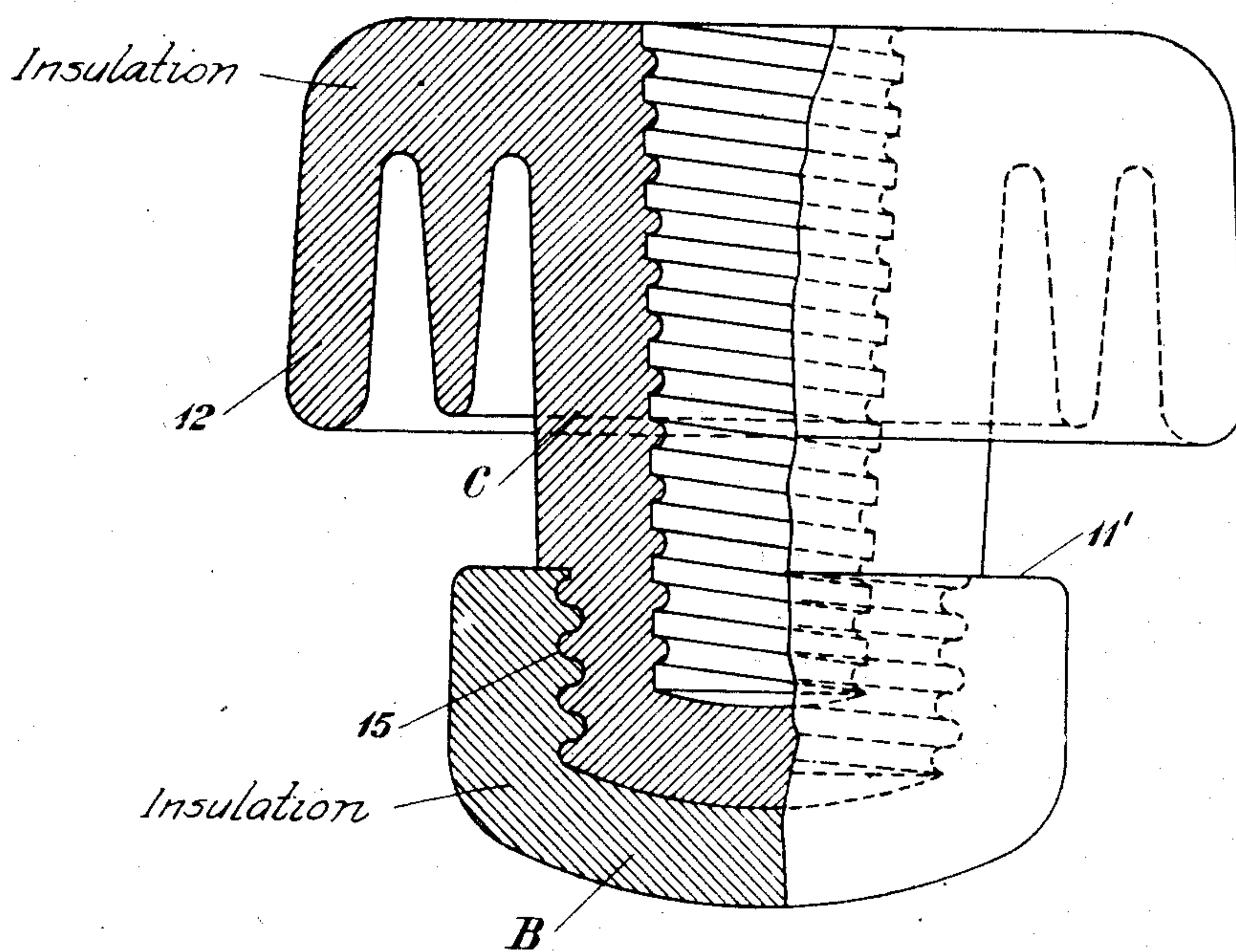


Fig. 2

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INSULATOR.

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This invention relates to improvements in insulators and more particularly to a construction of insulator adapted to stabilize the leakage loss under different weather conditions.

With the development of methods of transmitting telephonic and telegraphic signals by means of carrier currents propagated along open wire lines, new transmission problems have been introduced. Owing to the fact that the carrier currents employed are relatively high in frequency as compared with the voice currents or Morse currents utilized in the ordinary methods of communication it has been found that the attenuation is very markedly increased, so much so, in fact, that repeaters for amplifying the transmitted currents must be separated by much shorter distances, thereby adding to the expense of the plant outside the terminal stations at which the carrier apparatus is applied.

A very material part of this attenuation is due to leakage loss through the insulators which are customarily employed upon open wire lines, and this loss varies through a very wide range under different weather conditions. The insulator acts like a condenser, the glass of the insulator constituting the dielectric, the line wire and tie wire on the outside of the insulator comprising one plate, and the wooden pin upon which the insulator is supported comprising the other plate. The condenser thus formed introduces a leakage loss due to so-called dielectric hysteresis and this loss varies with the capacity of the condenser.

In dry weather, the outer plate of the condenser, that is, the portion of the line wire adjacent the insulator and its associated tie wire, constitutes a plate of relatively small area so that the capacity is relatively small and hence the leakage loss, even at carrier frequencies, is small as compared with the total attenuation of the circuit. During wet weather, however, the entire outer surface of the insulator becomes wet, with the result that the conductive area external to the insulator is very much increased. As a result, the capacity, and consequently the leakage loss, is very much increased. During the extremes of wet and dry weather the attenuation of the system varies through a wide range due to this cause alone, and this necessitates the provision of special regulating apparatus

for maintaining the transmission equivalent of the circuit constant under all weather conditions.

In order to avoid the expense of the regulating arrangements it becomes necessary to devise some method for stabilizing the capacity of the insulator, and hence its dielectric loss, at some constant value. In accordance with the present invention it is proposed to stabilize the capacity of the insulator at substantially its dry weather value, thereby not only eliminating the necessity for transmission-regulating apparatus but also reducing the number of repeaters requisite, since it will only be necessary to provide a sufficient number of repeaters to take care of the smaller losses experienced in dry weather.

The invention may now be more fully understood from the following detailed description when read in connection with the accompanying drawing, in which Figures 1 and 2 illustrate two embodiments of the invention.

In order to stabilize the loss of an insulator at substantially its dry weather condition it is necessary to prevent moisture from coming into contact with any surfaces of the insulator which are contiguous to the line conductor and tie wire. This may be conveniently accomplished by inverting the insulator. In the ordinary pole line construction supporting pins extend upwardly from the cross-arms and the insulators are mounted on the supporting pins above the cross-arms. In accordance with the present invention the insulator is so designed that the supporting pins may extend downwardly from the cross-arms and the insulators are supported on the pins below the cross-arms.

An insulator adapted to be used in this manner is shown in Fig. 1, in which A is a body of dielectric material having an interiorly screw-threaded opening 10 extending down into the body from the top. This opening is adapted to permit the dielectric body to be screwed upon a supporting pin extending downwardly from a cross-arm. At the lower end of the body a shoulder 11 is provided upon which the line conductor and tie wire may be secured. In order to prevent moisture due to rain or other form of precipitation from coming into contact with the shoulder 11 or the insulator surface either immediately above or immediately below said shoulder, the dielectric body A is provided with an external petticoat 12 extending out-

wardly and downwardly as shown, so that the lower edge of the petticoat is only slightly above and some little distance outward from the shoulder 11. In order to lengthen the dry path above the shoulder 11 to still further insure that there will be no conductive connection between the line conductor and tie wire and the upper surface of the insulator 10 (which is in inductive relation to the supporting pin) an additional petticoat 13 may be provided between the outer petticoat 12 and the main body A.

It will be clear that a construction such as that above described will prevent the surface of the insulator in the neighborhood of the line conductor and tie wire from becoming wet and hence there will be no substantial enlargement of the conductive area in the neighborhood of the line conductor and tie wire during wet weather. Accordingly, the alternating current leakage of the insulator is stabilized at a condition corresponding substantially to dry weather condition. Furthermore, the direct current leakage is stabilized at the dry weather condition by the provision of the long dry paths due to the under petticoats near the top of the insulator. By stabilizing the loss due to the insulator at or near the dry weather condition the number of repeaters necessary will be somewhat reduced, but what is more important, it is no longer necessary to provide equipment for maintaining the transmission constant for the transmission will not materially vary between extremes of wet and dry weather.

A slightly modified arrangement is illustrated in Fig. 2. In this case the shoulder to support the line conductor and tie wire is formed by an auxiliary cap-like member B whose internal bore is screw-threaded so that it may be screwed upon corresponding screw threads 15 upon the main dielectric body C. The shoulder 11' is then formed by the upper edge of the member B. This construction has the advantage that it is much simpler to mold the dielectric material in two parts, as shown in Fig. 2, than it is to mold the insulator as an integral whole in the form shown in Fig. 1.

Electrically, the arrangements of Figs. 1 and 2 are substantially the same.

It will be obvious that the general principles herein disclosed may be embodied in many other organizations widely different from those illustrated without departing from the spirit of the invention as defined in the following claims.

What is claimed is:

1. An insulator comprising a body of dielectric material having an internal screw threaded opening downwardly extending from the top into which a downwardly extending supporting pin may be screwed, a cap-like member of dielectric material arranged to be secured to the lower end of said body to form a shoulder above which the line conductor and tie wire may be secured, and a member extending outwardly and downwardly from said body to prevent moisture from being deposited on said shoulder, the shell of said body between said shoulder and said member being of substantially uniform thickness.

2. An insulator comprising a body of dielectric material having an internal screw threaded opening downwardly extending from the top into which a downwardly extending supporting pin may be screwed, a cap-like member of dielectric material arranged to be secured to the lower end of said body to form a shoulder above which the line conductor and tie wire may be secured, a member extending outwardly and downwardly from said body to prevent moisture from being deposited on said shoulder, the shell of said body between said shoulder and said petticoat being of substantially uniform thickness, and an auxiliary petticoat interposed between said outwardly and downwardly extending member and said body to increase the length of the dry path from the lower margin of said member to said seat.

In testimony whereof, I have signed my name to this specification this 25th day of June, 1925.

CHESTER S. GORDON.