A. O. AUSTIN.

INSULATOR.

APPLICATION FILED MAY 29, 1916.

1,281,268. Patented Oct. 15, 1918.

Fig. 1.

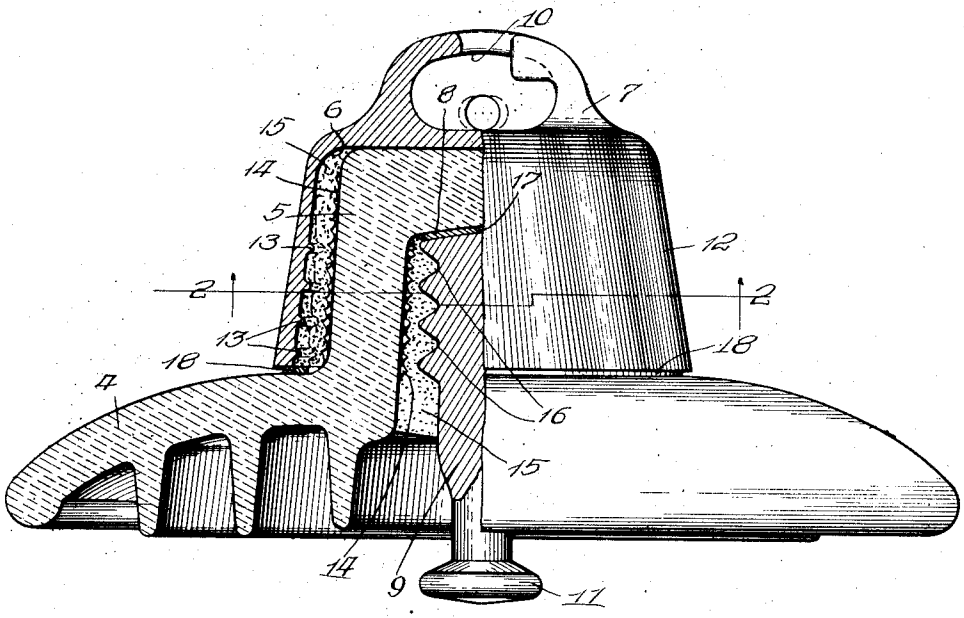
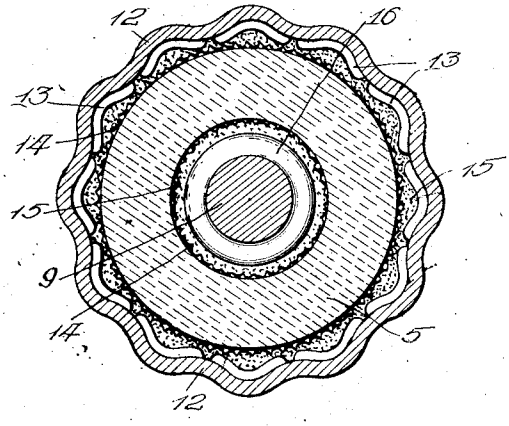


Fig. 2.



Witness.
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UNITED STATES PATENT OFFICE.

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INSULATOR.

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To all whom it may concern:

Be it known that I, ARTHUR O. AUSTIN, a citizen of the United States, residing at Barberton, in the county of Summit and State of Ohio, have invented certain new and useful Improvements in Insulators, of which the following is a specification.

This invention relates to an insulator which comprises separable parts having different coefficients of expansion, the insulator proper being of porcelain, glass, or some similar material which is secured to or supported by a metal cap or pin of which the coefficient of expansion is different than that of the insulator, so that when the parts are secured together, stresses will be set up in the most fragile element, due to the changes in temperature, which may be sufficient to disrupt it unless means is provided for relieving the pressure. The object of the invention is therefore, to produce a new and improved construction, combination and arrangement of parts by which any stress or strain due to unequal expansion and contraction of the parts may be relieved without breaking or impairing the insulator proper or causing the separation of the parts.

In the accompanying drawing, Figure 1 is a view, partly in elevation and partly in section, of an insulator unit constructed in accordance with the principles of my invention, and Fig. 2 is a sectional view taken on the line 2—2 of Fig. 1.

It has been found in insulator practice that due to the different coefficients of expansion of metal and cement over that of porcelian, glass or similar materials, very severe stresses may be set up in the insulating member due to the changes in temperature. These stresses may be so great as to cause the insulating member to be cracked or seriously damaged so that it will fail electrically or mechanically. If an insulator is subjected to a lower temperature than that in which it was assembled, the metal will contract setting up stresses in the porcelain due to the rigidity of the flange of the insulating member, the contraction of the metal cap tending to shear off the boss or hub of the insulator. This is particularly true if the metal cap is very rigid at its lower end or next to the insulator flange as this tends to concentrate the stress and produce a shear which may start a crack in the insulating member. By constructing the cap so that it will have flexible or yielding properties the insulating member will be relieved of a great amount of mechanical stress which will reduce it to a safe amount, thereby making the insulating units much more reliable, both electrically and mechanically, than the same units without the yielding provision.

This insulating unit therefore comprises an insulating member 4 of porcelain, glass or any other suitable material with an extending flange and a central hub or boss 5 adapted to be inserted in a cup-shaped recess 6 of a metal suspension cap 7. The boss is also formed with a recess 8 in which a metal suspension pin 9 is inserted and secured. The cap 7 is formed at the top with a suspension socket 10 by means of which a number of insulator units are connected together or suspended from a support, and the pin 9 is provided at its lower end with a head 11 adapted to be inserted in such a socket 10 in the well known manner. The cap portion of the cap is formed with a corrugated or fluted edge 12, and on the inside of the recess with a plurality of ribs 13 which serve to anchor a cap in the insulating member. If these ribs 13 were continuous they would serve also to strengthen the cap and prevent its yielding or flexible action under expansion or contraction; but by breaking or spacing the ribs apart, as shown more clearly in Fig. 2, this stiffening and strengthening tendency is overcome and the full yielding and flexible effect of the lower edge of the cap is maintained. The yielding or flexibility of the cap is increased by making the sides fluted and the breaks between the ribs are preferably at the innermost part of each fluting.

Both the inner surface of the recess 8 and the outer surface of the boss 5 which is inserted in the cap 7 is preferably formed with a rough or uneven surface 14 which forms a more secure anchorage for a cement 15 by means of which the metal parts are secured to the insulating members. This roughened surface is preferably formed by applying to the glaze of the insulating member before it is fired, rough and uneven particles which adhere to the glaze, and when the insulating member is fired become a substantially integral part of the insulating member itself, the sharp points or projections of the rough material extending above the glaze of the insulating member and forming a substan-

tial projection to which the cement 15 adheres very closely. The inserted end of the pin 9 is preferably formed with grooves 16 which anchor it more firmly in the cement 14, and between the innermost end of the pin and the recess of the insulating member a pad 17 of elastic or yielding material is inserted. A pad 18 of elastic or yielding material is also interposed between the lower edge of the cap 7 and the adjacent surface of the insulating member 4. This prevents the more or less sharp edge of the cap 7 from abrading the surface of the insulator, thereby preventing checks and cracks on the surface of the insulating member due to their relative movement under expansion and contraction.

This pad or gasket 18 also acts as a spacer and prevents the metal cap from bearing directly on the insulating member. If the gasket is of soft material it will yield, preventing the cap from bearing on the insulating member and setting up a high stress in it. Unless a spacer is used the cement may fill the space between the cap and insulating member which may be even more detrimental than if the metal was in direct contact for the cement may expand with time setting up a high stress. The lower edge of the cap may be coated with a resilient wax or paint accomplishing the same result. If the gasket or pad is not waterproofed it is desirable to remove same before installation.

With this construction the unequal expansion and contraction of the parts produce very little destructive action, for if the lower edge of the cap tends to shear off the boss of the insulating member the resilient action of the fluted edge will prevent the shearing stress from becoming excessive. The ribs, grooves and projections of the insulator parts tend to hold them firmly anchored into the cement so that there will be no mechanical separation, and the pads 17 and 18 allow for a relative expansion of the parts due to different coefficients of expansion of the insulating member and the other members.

I claim:

1. An insulator comprising members having different coefficients of expansion, one of said members being formed with wavy sides to relieve pressure in the other due to contraction thereof.

2. An insulator comprising members adapted to be secured together, one of said members being of resilient material and having fluted portions therein adapted to give to allow for the expansion or contraction of the other member.

3. An insulator comprising members secured together having different coffiecients of expansion, one of said members being formed to relieve pressure in the other due to expansion or contraction thereof, and an interposed yielding pad at the base of one member to prevent it from bearing on the other due to relative movement thereof.

4. In an insulator, a suspension cap formed of metal, having a hollow fluted portion, and a member secured within the fluted portion having a different cofficient of expansion than the cap.

5. In an insulator, the combination with a suspension cap having a fluted side, internal anchoring ribs broken at intervals to reduce the rigidity, an insulating member within the cap, and cement for holding the cap and member together, the said ribs being anchored into the cement.

6. In an insulator, the combination with a metal suspension cap having a fluted depending portion with internal ribs broken at intervals, and an insulating member secured within the fluted portion.

7. In an insulator, the combination with a metal cap having a suspension portion and a hollow fluted portion connected thereto and with broken ribs within the fluted portion, of an insulating member having a boss adapted to be inserted within the fluted portion, and a connecting cement interposed between the insulating member and the cap and anchored to the cap by the said broken ribs.

8. In an insulator, the combination with an insulating member having a boss and uneven substantially integral projections on the boss, of a metal suspension member and resilient wavy portions integral with the suspension member adapted to extend over the boss of the insulating member having broken internal ribs, and a connecting cement interposed between the said ribs and the projections of the boss which are both anchored in the cement.

9. In an insulator, the combination with an insulating member, of a metal suspension member having an expansible shell adapted to fit over a portion of the insulating member, cement for connecting the insulating member and the metal suspension member, and a resilient material interposed between the edge of the suspension member and the adjacent surface of the porcelain to permit the relative movement of the parts due to their different coefficients of expansion.

10. In an insulator, the combination with a metal suspension pin, of a metal suspension cap having a wavy resilient portion and an insulating member having a recessed boss which fits within the cap and in the recess of which the pin is located, and means for securing the cap and pin to the insulating member, the said resilient portion of the cap being adapted to relieve the strain due to the expansion or contraction of the parts.

11. In an insulator, the combination with a metal suspension pin and a metal suspending cap, of an insulating member interposed between them, and means for rigidly con-

necting the pin and the cap to the insulator, the said cap being formed with a wavy yielding portion which permits of the relative expansion of the insulating member without straining it to the breaking point due to the different coefficients of expansion of the member and the metal.

12. In an insulator, the combination with an insulating member, of a metal suspending cap cemented thereto having wavy yielding sides for permitting expansion or contraction due to heat to relieve the member of the strain of a rigid metal cap member.

13. In an insulator, the combination with an insulating member formed with a projecting boss, of a suspending cap secured thereto having a recessed portion adapted to fit over the boss and provided with wavy yielding sides which relieve the unequal pressure due to contraction of the cap.

14. In an insulator, a suspending cap having a cup-shaped portion for the reception of an insulating member and with a resilient fluted side which yields under expansion or contraction.

15. In an insulator, a suspending cap having a cup-shaped portion with fluted sides which extend over an insulating member, and with internal ribs for anchoring the cement broken at intervals to lessen the stiffness of the sides.

16. In an insulator, a metal suspension cap having wavy sides extending to the edge thereof, an insulating member secured in the cap with an extending flange, and resilient material between the edge of the cap and the adjacent flange of the insulating member.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 26th day of May, A. D. 1916.

ARTHUR O. AUSTIN.

Witnesses:
K. W. WONNELL,
A. J. CRANE.