March 12, 1935. J. J. TAYLOR 1,994,293

INSULATOR

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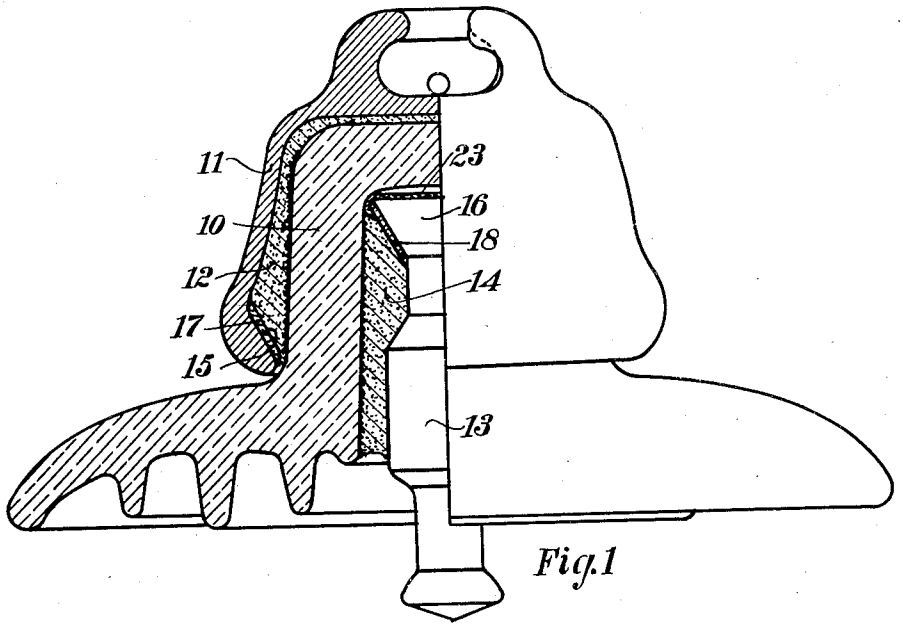


Fig.1

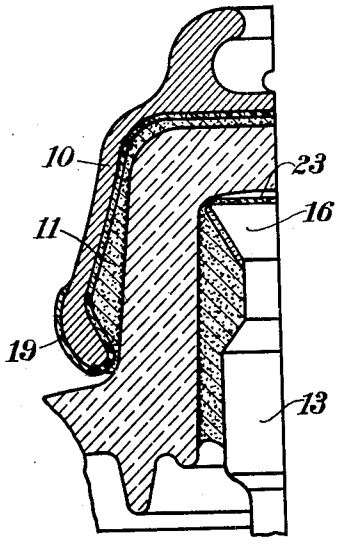


Fig.2

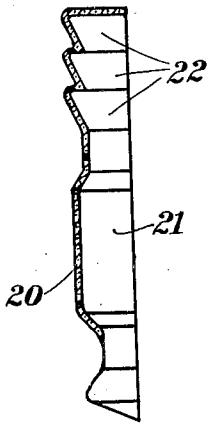


Fig.3

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INSULATOR

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8 Claims. (Cl. 173—318)

This invention relates to electric insulators and has for one of its objects the provision of an insulator which will withstand high mechanical loads and variations in temperature conditions without injury to the dielectric material.

Another object of the invention is to provide an electric insulator of improved construction and operation.

Other objects and advantages will appear from the following description.

The invention is exemplified by the combination and arrangement of parts shown in the accompanying drawing and described in the following specification, and it is more particularly pointed out in the appended claims.

In the drawing:

Fig. 1 is an elevation with parts in section showing one embodiment of the present invention.

Fig. 2 is a fragmentary section showing a modified form of the invention.

Fig. 3 is a fragmentary section showing another modification.

Referring first to Fig. 1 of the drawing, the numeral 10 designates a dielectric body of porcelain or other suitable material, comprising a disc and an attachment head having a recess therein. A cap 11 surrounds the attachment head and is secured thereto by cement 12. The surface of the porcelain is suitably roughened to provide a bond between the porcelain and the cement, but the inner surface of the cap is preferably coated with wax, bitumen or other material to prevent bonding of the cement to the cap. The pin 13 has one end thereof extending into the recess in the attachment head and held in the recess by cement 14. The inner surface of the recess in the porcelain is roughened to provide a bond for the cement, but the surface of the pin is preferably coated to prevent bonding of the pin to the cement. The cap and pin are provided with bearing faces 15 and 16 respectively which are tapered in the same direction and disposed in opposition to each other so that when a load is placed upon the insulator, the cement and porcelain between the two bearing faces will be placed under compression to support the load. The direction of force transmitted by the dielectric member will be approximately normal to the bearing faces 15 and 16.

The metal and porcelain members have different coefficients of expansion for temperature changes so that the cap tends to contract upon the attachment head when the temperature falls, and the pin tends to contract away from its bearing face. When the temperature rises, the two metal members expand, tending to produce a bursting stress upon the porcelain. However, the wedging faces of the two bearing members operate to compensate for differential expansion and contraction, due to temperature changes, since the metal members will move in the direction of the load and maintain a close bearing contact between the bearing faces and the attaching cement.

It is desirable, therefore, to provide bearing contact between the metal members and the cement which will insure freedom of movement of the engaging bearing faces relative to each other. It is also desirable to distribute the load uniformly over the bearing faces to prevent concentration of the load at any point on the porcelain. To secure these results, I provide thin layers of rubber 17 and 18 on the bearing faces of the cap and pin respectively. This rubber coating has one surface firmly attached to the metal, and the other surface will adhere sufficiently to the cement to prevent slipping between the surfaces of the rubber coating and the contacting material, but the rubber itself will yield sufficiently to permit the relative movement between the metal and the cement necessary to compensate for differential expansion and contraction, due to temperature changes, and also to equalize the pressure on the bearing faces, due to any unevenness in the bearing surfaces. The layers of rubber are substantially confined within a closed space and the particles of the rubber move relative to one another in a manner similar to a liquid contained in a vessel, so that the distribution of pressure upon the surfaces of the rubber follows substantially the laws governing hydrostatic pressure of a liquid; that is, the pressure will be uniformly distributed over the entire surface. It will thus be seen that the layer of rubber not only permits relative movement necessary to compensate for differential expansion and contraction of the connected parts, but also provides ideal means for uniformly distributing the pressure upon the bearing faces. The degree of hardness of the rubber will vary according to conditions. Since the loads are heavy, sufficient yielding will be produced even though the rubber in some cases might be quite hard.

In Fig. 1 the rubber is substantially sealed in its pocket so that it is protected from electrical discharges and from weather conditions,

which might tend to cause deterioration. Under some conditions, however, especially where the insulator is exposed to foreign material in the atmosphere, which will tend to attack the metal parts, it may be advisable to continue the rubber coating over a portion or all of the exposed metal surfaces, as shown in Figs. 2 and 3. There are many atmospheric conditions which are withstood better by rubber than by metal and under such conditions, the rubber may be continued over the exposed metal surfaces.

There are a number of ways by which the rubber may be firmly attached to the metal surfaces, such as vulcanizing under pressure or electro-plating from latex, or by applying a liquid or semi-liquid coating of rubber of the proper composition and permitting it to harden upon the surface. The exact steps of these processes are well known to workmen skilled in the vulcanizing art.

In Fig. 2 the rubber coating is made to extend around the edge of the cap and up over the outer surface, as shown at 19. This protects the cap where the greatest danger of corrosion and electrical discharge occurs, and provides not only protection from corrosion but also tends to prevent formation of corona emanating from the edge of the cap since the rubber is an insulating material and opposes the corona streamers.

In Fig. 3 the rubber coating is shown at 20, extending down over the pin past the point where the cement is discontinued, which is the point on the pin subject to greatest corrosion and corona discharge. The pin 21 in Fig. 3 is provided with a plurality of bearing surfaces 22 instead of a single bearing surface, as shown in Figs. 1 and 2. The coating 20 is continued over the upper end of the pin in Fig. 3, and in Figs. 1 and 2 a yielding disc 23 is placed upon the upper end of the pin.

I claim:

1. An insulator comprising a dielectric member and a metal fitting having cooperating, substantially parallel, wedging bearing faces inclined relative to the direction of the load on said insulator so that the load on said insulator tends to draw said faces together, and a thin layer of elastic rubber or equivalent material interposed between said bearing faces and bonded to the surface of said metal fitting and acting to reduce friction between said surfaces to facilitate relative movement thereof and providing a resilient force, due to distortion of said rubber, tending to restore said parts when said parts are moved relative to each other.

2. An insulator comprising a dielectric member having a recess therein, a pin having one end thereof disposed in said recess and having a wedging bearing face tapered toward the free end of the pin, cement surrounding said pin and having a tapered bearing face substantially parallel with the bearing face of said pin, and a thin layer of elastic rubber or equivalent material interposed between said bearing faces and bonded to one of said faces, and acting to reduce friction between said surfaces to facilitate relative movement thereof and providing a resilient force, due to distortion of said rubber, tending to restore said parts when said parts are moved relative to each other.

3. An insulator comprising a dielectric member having an attachment head thereon, a cap surrounding said head and having a tapered bearing face, cement interposed between said cap and attachment head and having a tapered bearing face cooperating with the bearing face on said cap, said bearing faces being substantially parallel and inclined in a direction to be drawn together by the load on said insulator, and a thin layer of elastic rubber or equivalent material interposed between said bearing faces and bonded to one of said faces and acting to reduce friction between said surfaces to facilitate relative movement thereof and providing a resilient force, due to distortion of said rubber, tending to restore said parts when said parts are moved relative to each other.

4. An insulator comprising a dielectric member having an attachment head thereon provided with a recess, a pin disposed in said recess and having a tapered bearing face inclined inwardly toward the free end of the pin, cement disposed in said recess about said pin and having a tapered bearing face substantially parallel with the bearing face of said pin, a thin layer of elastic rubber or equivalent material interposed between said bearing faces, a cap surrounding said attachment head and having a tapered bearing face inclined in the same direction as the bearing face on said pin, cement interposed between said cap and attachment head and having a tapered bearing face substantially parallel with the bearing face on said cap, and a thin layer of rubber interposed between the bearing face on said cap and the cooperating bearing face on said cement and acting to reduce friction between said surfaces to facilitate relative movement thereof and providing a resilient force, due to distortion of said rubber, tending to restore said parts when said parts are moved relative to each other.

5. An insulator comprising a dielectric member having an attachment head provided with a recess, a pin having one end thereof disposed in said recess and having a tapered bearing face inclined inwardly toward the free end of the pin, cement disposed in said recess about said pin and forming a substantially closed but not liquid tight pocket adjacent the bearing face of said pin, and a layer of elastic rubber or equivalent material disposed in said pocket and having one surface engaging the bearing face of said pin and bonded thereto, and the other surface thereof engaging the bearing face of said cement.

6. An insulator comprising a dielectric member having an attachment head, a cap surrounding said head and having a tapered bearing face, cement interposed between said cap and attachment head and forming a substantially closed but not liquid tight pocket adjacent said bearing face, and a layer of elastic rubber or equivalent material disposed in said pocket and having one surface thereof bonded to said bearing face, and the other surface thereof engaging said cement.

7. An insulator comprising a dielectric member having an attachment head provided with a recess therein, a pin having one end thereof disposed in said recess and having a tapered bearing face inclined inwardly toward the free end of the pin, cement disposed in said recess about said pin and forming a substantially closed but not liquid tight pocket adjacent said bearing face, a layer of elastic rubber or equivalent material disposed in said pocket having one surface thereof bonded to the bearing face on said pin, and the other surface thereof engaging said cement, a cap surrounding said

attachment head and having a tapered bearing face inclined in the same direction as the bearing face of said pin, cement disposed in said cap about said attachment head and forming a substantially closed but not liquid tight pocket adjacent the bearing face on said cap, a layer of rubber disposed in said pocket and having one surface thereof bonded to the bearing face on said cap, and the other surface thereof engaging said cement.

8. An insulator comprising a dielectric member having an attachment head thereon provided with a recess, a cap surrounding said head, a pin disposed in said recess, said pin and cap having wedging bearing faces tapered in the same direction, said dielectric member having bearing faces rigid therewith and substantially parallel to the bearing faces of said cap and pin respectively so that said bearing faces are drawn together by the load on said insulator, and a thin layer of elastic rubber or equivalent material interposed between the members of at least one pair of said parallel bearing faces and bonded to one of said bearing faces.

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