Mar. 13, 1923. 1,448,604.

L. STEINBERGER.

COLUMN STRAIN INSULATOR.

FILED DEC. 6, 1918.

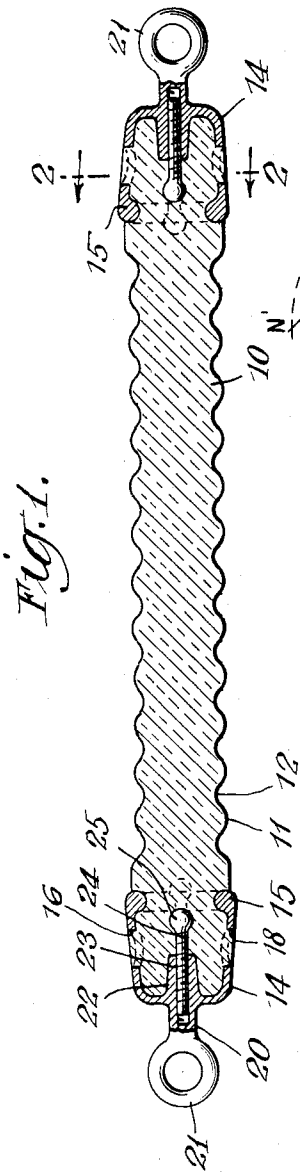


Fig. 1.

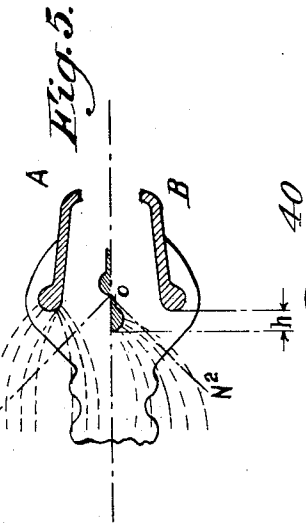


Fig. 5.

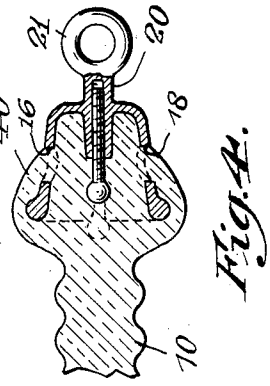


Fig. 4.

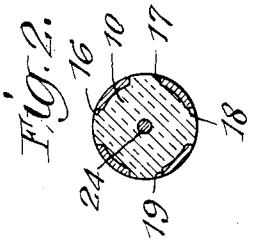


Fig. 2.

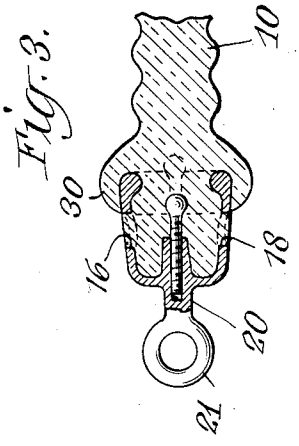


Fig. 3.

WITNESS

Harold Brockerow

Louis Steinberger INVENTOR

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Patented Mar. 13, 1923. 1,448,604

UNITED STATES PATENT OFFICE.

LOUIS STEINBERGER, OF BROOKLYN, NEW YORK.

COLUMN STRAIN INSULATOR.

Application filed December 6, 1918. Serial No. 265,490.

To all whom it may concern:

Be it known that I, LOUIS STEINBERGER, a citizen of the United States, and a resident of the borough of Brooklyn, city and State of New York, have invented certain new and useful Improvements in Column Strain Insulators, of which the following is a specification.

Among the objects of my invention are to provide an insulator with materially increased dielectric properties and at the same time possessing mechanical strength to a high degree, to construct insulators of various types provided with means for the redistribution of the electrostatic field surrounding the insulator, thereby avoiding concentration of the dielectric stresses at any point, and providing for a free dissipation of energy; and to construct insulators provided with means embedded within the material of the insulator for weakening and distributing the electrical stresses.

Another object of the invention is to provide a rod type strain insulator with cup shaped terminals molded at each end, the terminals being provided with adjustable depending members or stress distributors within the cups.

Another object is to provide a rod type insulator with cup shaped terminals molded thereto at each end, the said terminals being provided with depending tongues having globular ends which are adjustable within the bell shaped portion of the terminal to act as a stress distributor for redistribution of the dielectric stresses.

Other objects will appear from the subjoined description and claims.

Referring to the drawings:

Fig. 1 is a view partly in elevation, partly in section of a structure embodying one form of my invention.

Fig. 2 is a cross section on line 2—2 of Fig. 1.

Fig. 3 is a cross section broken away, of one end of an insulator showing another form of my invention.

Fig. 4 is a view similar to Fig. 3 of an end of an insulator showing still another form of my invention.

Fig. 5 is a detail sectional view of a terminal of the insulator showing a stress distributing member in different positions and illustrating the stresses produced in these positions.

This invention is a continuation in part of the invention shown, described and claimed in my co-pending applications Serial No. 156,012 filed March 20, 1917, and No. 460,447, filed April 11th, 1921.

In the drawings in which the same reference characters indicate the same parts in the several views, 10 represents the body of insulating material which is of rod type, and is provided on its outer surface with a series of ridges 11 and grooves 12 in order to increase its area.

At each end of the insulator I provide cup or bell shaped terminals forming caps in connection with adjustable members forming stress distributors, and as the terminals at each end are the same in structure and are applied to the rod of insulating material in the same way during the process of manufacture, it is only necessary in the interest of clearness and brevity to describe the structure at one end.

A bell or cup shaped terminal forming a cap is molded and anchored to each end of the rod of insulating material 10 which may be made of any suitable insulating material but preferably of that material known in the art as electrose. The bell shaped portion of the terminal is provided at its inner edge with an interiorally disposed bead 15 for the purpose of anchoring the cup to the insulating material when it is molded thereto. In addition to the bead within the inner rim of the cup there are four apertures 16, 17, 18 and 19 in the side of the bell or cup, oppositely disposed to each other and approximately 90 degrees apart and located centrally in relation to the cup.

When the insulator is manufactured these apertures are filled with electrose, as clearly shown in Fig. 1, and the insulator body is then molded to the cup shaped terminal. The outer surface of the electrose is flush with the outer surface of the bell shaped portion of the metal terminal, thus providing additional and ample anchorages to decrease the likelihood of the bell shaped terminal being pulled away from the ends of the rod of insulating material.

Extending from the end of the bell shaped portion at the central thereof is a neck 20 joining an eyelet 21 which is utilized as a fastening means for the insulator.

Within the bell shaped terminal at the central portion thereof extends a projection 22 which has a screw-threaded cavity 23 axially disposed therein. A rod 24 screw-

threaded at one end and provided with a globular bead at the other end, is adjustably secured to the cavity 23 and is so arranged that the rod or tongue 24 may be adjusted to any suitable position within or without the bell shaped terminal.

The globular end or ball shaped portion 25 of the projecting tongue 24 may thus be located at the proper position with relation to the bead on the interior edge of the cup so that the projecting tongue will act as a stress distributor to cause redistribution of the dielectric stresses and strains.

The position of the bell shaped end of the tongue is adjustable and is so constructed that it may be located within the bell, or outside thereof, before molding, in accordance with the requirements, and as clearly shown in full and in dotted lines in the drawings.

The details of construction shown in Figs. 3 and 4 differ only from those shown in Fig. 1 in that the ends of the insulating body 10, at 30 in Fig. 3, are molded into such a shape as to entirely surround the beaded edge of the cup shaped terminal and the insulating material is brought to the lower edges of the openings or apertures 16, 17, 18 and 19 in the sides of the bell portion.

In Fig. 4, the insulating material 40 at the end of the rod 10 is brought up to such a point as not only to entirely surround the beaded edges of the bell shaped terminal, but also to completely cover the apertures 16, 17, 18 and 19 in the sides of the bell shaped terminal.

In Fig. 5 the position of the flux lines for two different positions of the tongue is illustrated; the upper part A of the figure showing the lines when the tongue is adjusted to a position within the bell shaped member and the lower part B of the figure showing the lines when the tongue is adjusted to project beyond the mouth of the bell shaped member.

When the tongue 25 is inside the bell shaped member 16, as at A, it exerts substantially no effect on the field due to the bell, and permits the flux lines to emanate from the insulator surface at considerable angles to the insulator surface normals such as ON_1.

When the tongue projects beyond the bell as at B, it displaces the field due to the bell shaped member outwardly from the axis. A suitable adjustment of the distance h causes the flux lines to emanate from the insulator surface along the normals such as ON_2. This adjustment varies with the dielectric constant of the insulator material as well as with the shape of the insulator head. It will be understood that the relative positions of the bell 16 and the ball 25 may be adjusted to give any desired direction to the lines of flux.

It will be seen that this combination of ball and bell shaped member permits of the adjustment of the direction of the static field near the head of the insulator without sensibly diminishing the cross section of the insulating material subject to mechanical tension.

As changes of construction could be made within the scope of my invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:

1. An insulator which comprises an insulator body, a rod extending into the end portion of said body, an enlargement on the end of said rod, said enlargement and the portion of the rod within the insulator body being totally embedded in said body, said rod being provided with a cap member encircling the end portion of said body about said rod to retain the end portion of said body about said enlargement.

2. An insulator which comprises an insulator body, rods, one at each end thereof extending into the end portion of said body, an enlargement on the end of each rod, said enlargement and the portion of the rod within the insulator body being totally embedded in said body, each of said rods being provided with a cap member encircling the end portion of said body about its rod to retain the end portion of said body about its enlargement.

3. An insulator which comprises an insulator body, rods, one at each end extending into the end portion of said body, an enlargement on the end of each rod, said enlargement and the portion of the rod within the insulator body being totally embedded in said body, each of said rods being provided with a cap member encircling the end portion of said body about its rod to retain the end portion of said body about its enlargement, and said cap member being provided with a bead extending inwardly from its edge.

4. In a device of the kind described, a body of insulating material provided with cup shaped terminals one at each end, the terminals being provided with tongues projecting towards each other and embedded within the insulating material to form stress distributors, and means for adjusting the position of said tongues in said cup shaped terminals when not embedded in said insulating material.

5. In a device of the kind described, a body of insulating material of rod type, provided with cup shaped terminals anchored one at each end, tongue portions embedded in said body of insulating material and

means for adjustably securing said tongue portions to the bases of the cup shaped terminals to permit adjustment of said tongues when not embedded in said insulating material, said tongues being adapted to co-operate with said cup shaped terminals to control the distribution of electrical stresses.

6. In a device of the kind described, a body of insulating material of rod type, provided with cup shaped terminals molded thereto, one at each end, and each provided with an integral projection extending within the cup, tongues embedded in said body of insulating material, one at each end, each tongue provided with a globular end, means for adustably securing each tongue respectively to each projection axially thereof to permit adjustment when not embedded in said insulating material, each tongue being located midway within the respective central portion of the cup shaped terminals.

7. In a device of the kind described, a body of insulating material of rod type, provided with cup shaped terminals molded one to each end of the insulating material and anchored thereto, a tongue shaped element having a globular end embedded in said body of insulating material one at each end, and means at each end for adustably securing each tongue shaped element to the respective central portions of the cup shaped terminals and located within the same to permit adjustment of said tongues when not embedded in said insulating material, the said tongue shaped elements acting as stress distributors.

8. In a device of the kind described, a rod of insulating material provided with cup-shaped terminals, embedded therein one at each end, the terminals being provided with projections on the inside thereof embedded in said insulating material, and means for adjustably mounting said projections on said terminals to permit adjustment of said projections relatively to said cup shaped terminals when not embedded in said insulating material.

9. In a device of the kind described, a rod of insulating material, provided with cup-shaped terminals one at each end, the terminals being provided with apertures in their sides, beads around their rims to aid in securely holding said insulating material, projections embedded in said insulating material, and means for adjusting the position of said projections to bring their outer ends respectively to either side of the planes of said beads, said adjustment being possible when not embedded in said insulating material.

In witness whereof I have hereunto set my hand at the borough of Manhattan, city and State of New York, this 27th day of November, 1918.

LOUIS STEINBERGER.

In presence of—
ZITA M. GRAHAM.