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Apr. 17, 1923. 1,451,968

L. STEINBERGER

INSULATOR

Filed July 25, 1918 2 Sheets-Sheet 1

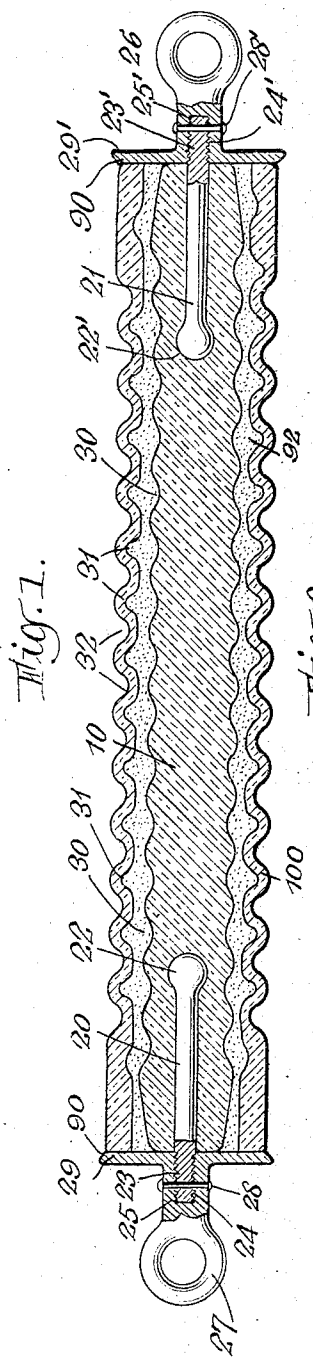


Fig. 1.

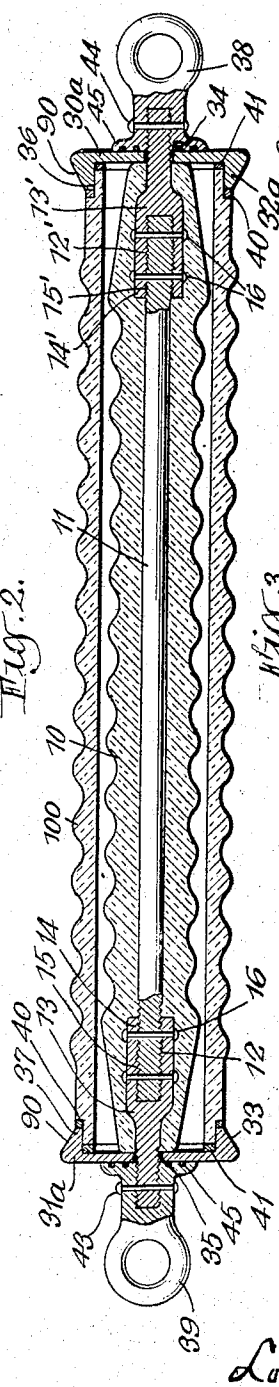


Fig. 2.

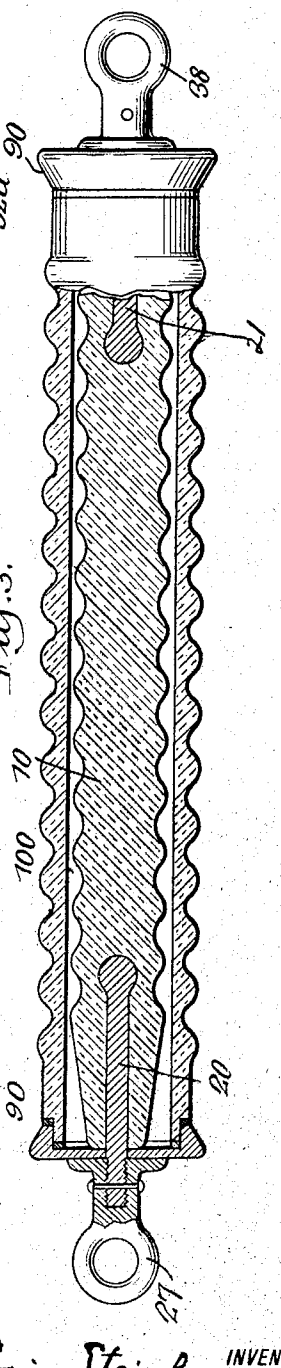


Fig. 3.

Louis Steinberger INVENTOR

BY Cornelius C. Billings

his ATTORNEY

Witness

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2 Sheets-Sheet 2

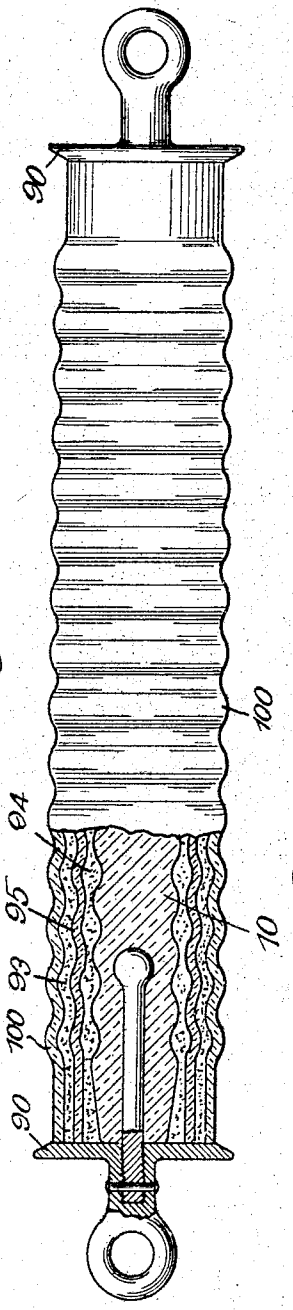


Fig. 5.

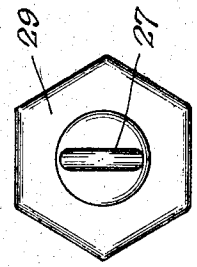


Fig. 6.

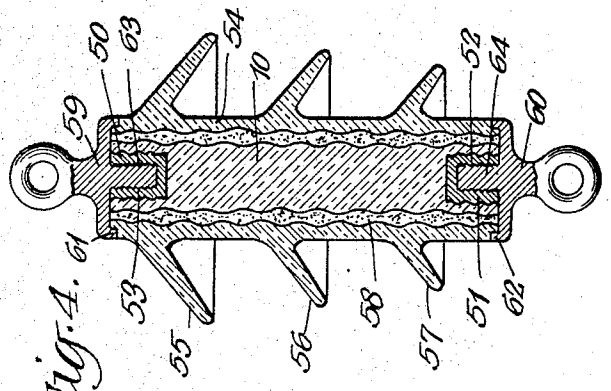


Fig. 4.

Louis Steinberger INVENTOR

Cornelius C. BY Pitkin & Pitkin

ATTORNEY

Patented Apr. 17, 1923. 1,451,968

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UNITED STATES PATENT OFFICE.

LOUIS STEINBERGER, OF BROOKLYN, NEW YORK.

INSULATOR.

Application filed July 25, 1918. Serial No. 246,650.

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 Insulators, of which the following is a specification.

My invention relates to strain insulators and it consists more particularly of an insulator construction having a heat resisting or fire proof cover, which cover is also of insulating material and is provided with a smooth surface. Each of these qualities is present in porcelain, and consequently porcelain is a suitable material from which the cover may be made.

The insulator forming the subject matter of my invention is adapted for use in wireless installations and is frequently so installed on shipboard as to be situated near the funnel in such a position that the hot products of combustion as they are emitted from the funnel strike the insulator.

One of the objects of the invention therefore is to protect the insulating body proper from the hot products of combustion and at the same time render it easy to clean the surface thereof from the soot accumulated thereon. This may be readily accomplished by the manual washing thereof, or when rain in sufficient quantity and force beats upon it.

Another object is to provide a composite insulator the main portion of which is formed of material having high insulating quality and the outer portion forming a protecting cover which is made of insulating material having high heat resistance.

Another object of the invention is to provide a composite insulator composed of material having high insulating qualities covered with an insulating material having high heat resisting qualities, the two being connected together by an insulating cement to form an integral whole for the purpose of increasing the mechanical strength of the insulator. Another object is to provide means for protecting the body of the insulator from breakage or chipping when the insulators are either laid upon the ground or packed for shipment.

Another object is to provide the highest possible insulation value combined with the greatest mechanical strength and to increase the heat resistance of the insulator.

Other objects will appear from the hereinafter description and claims.

Referring to the drawings in which the same reference characters indicate the same parts in the several views:

Fig. 1 represents a longitudinal section of a form of insulator embodying the invention.

Fig. 2 is a longitudinal section with parts in elevation, showing another form of insulator embodying the invention.

Fig. 3 is a longitudinal section of another form of the invention.

Fig. 4 is a longitudinal section of an embodiment of the invention applied to a strain insulator differing in form from the strain insulators shown in Figs. 1, 2 and 3.

Fig. 5 is a longitudinal section of a form of insulator illustrating a modification of the invention.

Fig. 6 is a plan view of an insulator, a section of which is shown in Fig. 2.

In Fig. 1 is illustrated a rod type insulator the body 10 of which is formed preferably of the insulating material known in the art as "electrose" and molded thereto and extending longitudinally and centrally thereof at each end respectively is a rod 20 and a rod 21 to function as combined strain members and stress distributors. The embedded ends of these rods are rounded or globular in form at 22 and 22′ and the projecting ends 23 and 23′ of these rods have screw threads 24 and 24′ thereon for engagement with screw threaded sockets 25 and 25′ of the eye bolts 26 and 27. These eye bolts may also be secured to the rods by rivets or bolts 28 and 28′, as clearly shown in the drawing. Extending from the bottom of the eye bolts are flanges 29 and 29′ which are preferably hexagonal, in horizontal cross section, the form of which is clearly indicated in Fig. 6. The perpendicular distances from the sides of these polygonal flanges to the axis of the device are greater than the maximum radii through a horizontal section of the composite insulator so that when the insulator is laid upon the floor or platform the outer surface of the same will be protected and the insulator will rest in a fixed

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position upon the sides of the flanges. The protecting flanges are beveled as at 90, as shown in Figs. 1, 2, 3 and 5, the beveled surface running towards the insulator so as to permit the accumulated soot and dirt to be readily washed away.

In constructing the insulator the various parts or elements forming the same are assembled in the following manner. The body 10 of the rod type insulator made preferably of "electrose," is molded around the strain members or rods 20 and 21 so that they remain in a central longitudinal position, the screw threaded ends of each projecting therefrom at each end. A tube of porcelain 100 or other insulating heat resisting or fireproof vitreous material of substantially the same length as that of the main body of insulating material, is then slid over the body of "electrose" and so positioned that there will be a space between the inner surface of the porcelain tube or cover and the outer surface of the "electrose" rod. The surface of the rod is provided with a series of circular grooves 30 and the inner surface of the porcelain tube is also provided with a series of circular grooves 31. The outer surface of the porcelain tube is also preferably provided with a series of circular grooves 32 which increase the surface area thereof.

After the porcelain tube is slipped over the insulating body of "electrose" the space intervening between the porcelain cover and the insulator body is filled with a liquid insulating compound 92 which may be of cementitious material, which will flow into the space and completely fill the same between the two insulators. The compound is of such a character that it will set to a comparatively hard degree within a short time after being put in the recess and will ordinarily thoroughly cling to both the porcelain and to the "electrose," but it is not necessary for this filling compound to become stone hard. As will be seen, the filling compound enters the grooves 30 and 31, thereby filling the entire space and preventing a relative longitudinal movement between the central body of the insulator and the porcelain cover.

After the filling compound has been put in place the eye bolts as above described are screwed into the screw-threaded ends of the strain members, as clearly shown in the drawings and as will be readily understood from the description hereinabove made.

The functions of the combination hereinabove described are as follows: The porcelain sleeve, cover or shield which is applied over the rod type strain insulator produces a high heat resisting and in fact a fire-proof surface, thereby protecting from destruction the non-fire-proof insulating material of which the rod type insulator may be made. As has been stated, it is preferable to make this insulating body of the insulating material known in the art as "electrose," but hard rubber, wood or similar insulating material may be utilized. When the body is formed of wood or non-molding material, then the strain members are secured to the ends of the wood by inserting them in holes formed for that purpose and cementing them to the wood, as will be clearly understood.

The mechanical strength of the insulating body as a whole is increased when the porcelain tube is cemented to the central body of insulating material, for the reason that when the insulating cement is placed in the recess between the porcelain cover or tube and the insulating body and attaches itself to each, the porcelain sleeve will increase the mechanical value of the "electrose" or other material of which the strain member may be made. In the case of "electrose" the porcelain cover when secured by the insulating cement, as hereinbefore described, may increase the mechanical value of the entire insulator at least 100 per cent, because the cement clings so thoroughly to both the inner body and to the outer tube that there is in effect, an integral body made of three materials.

From this fact it also follows that the insulating value of this composite insulator is also increased.

As has been referred to, the hexagonal shaped flanges which extend out beyond the surface of the porcelain cover not only protect the porcelain cover when the insulators are placed upon the floor or support, but the insulating body itself will rest in a fixed position when so placed.

Referring now to Fig. 2, the body of insulating material 10 which is preferably made of the insulating material known in the art as "electrose" may be molded around a fibre rod 11, the said rod being then situated along the axis of the insulator as illustrated. At each end of the fibre rod 11 screw threads 12 and 12′ are provided to which are secured the members 13 and 13′, the projecting ends of which are screwthreaded at 14 and 14′, and the embedded ends of which are provided with screwthreaded sockets 15 and 15′, the said screw-threaded sockets engagingwith the screwthreads at the respective ends of the fibre rod 11. As an additional means for holding the socket members to the fibre rod I provide rivets or bolts 16, 16′ extending through the rod and the socket of the eye bolt.

In the construction of Fig. 2, the parts are assembled as follows: The body of the insulating material which has been first molded around a fibre rod to which the securing members 13 and 13′ have been attached, is slipped into a tube of heat resisting or fire-proof insulating material 100, preferably porcelain, the length of the tube

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of porcelain being substantially the same length as the central body of insulating material, and the inner diameter of the tube of porcelain being greater than the maximum diameter of the central body of insulating material. Two metal caps 30ª and 31ª provided with inwardly projecting flanges 32ª and 33 with central openings 34 and 35 are then placed in position on the insulator over the respective ends thereof by inserting the screwthreaded ends of the members 13 and 13′ through the central openings in the caps. The projecting flanges 32ª and 33 of the caps are constructed to fit in circular grooves 36 and 37 formed on the respective ends of the heat resisting or fire-proof sleeve, as said sleeve as has been said, is substantially equal in length to the length of the insulating body. Washers 40 and 41 of leather or other yielding material are placed between the abutting portions of the metal caps and the porcelain cover so as to make as near a waterproof joint as possible. Eye bolts 38 and 39 are then screwed into place at the ends of the insulator, as clearly illustrated in Fig. 2, and serve to rigidly hold the respective parts together. As an additional holding means rivets or bolts 43 and 44 are passed through the shank of the eye bolt and the projecting screwthreaded ends of the holding members 13 and 13′. Washers of leather or other yielding material 45 are so placed between the bottom of the eye bolt and the outer surface of each cap as to also make the joint as nearly water tight as possible.

As shown in Fig. 6, the metal caps are hexagonal in shape so that the insulator may rest upon an even surface when placed upon the floor or other support and the supporting surfaces are such a distance from the axis of the insulator as to prevent the outer surface of the covering of porcelain from being destroyed or chipped when laid upon the floor.

In Fig. 3 is illustrated a structure similar in all respects to that shown in Fig. 2, with the exception that the fibre rod construction of Fig. 2 is replaced by rods or strain members 20 and 21 similar to those shown in Fig. 1. Hence it is not necessary to describe further in detail the construction shown in Fig. 3.

In the construction illustrated in Figs. 2 and 3 the mechanical strain to which the insulator is subjected is limited absolutely and solely to the "electrose", wood or rubber, as the case may be, of which the longitudinal body of the strain insulator is made. No mechanical strain whatever is placed upon the porcelain sleeve. The holes in the caps are slightly larger in diameter than the diameters of the projecting ends of the strain members, and it is apparent that any pull which is exerted will be taken up by the insulating body of "electrose" or other insulating material without straining the porcelain cover in any way.

Referring to Fig. 4 there is illustrated a strain or suspension type of insulator and it is made up of "electrose", the body 10 of which has socket members 50 and 51 molded therein at each end, the sockets being screwthreaded at 52 and 53 and opening outwardly and in opposite directions from each other. These socket members are provided with roughened means at the surface to hold the same securely to the body of insulating material. A porcelain sleeve 54 having hoods or discs 55, 56 and 57 integral therewith, is then placed around the "electrose" body and the filling cement of insulating material 58 is disposed between the "electrose" and the porcelain. The cement will attach itself to both the "electrose" and the porcelain in a very strong and durable manner, thereby increasing the mechanical strength of the entire structure. Eyelet caps 59 and 60 having flanges 61 and 62 at the outer peripheral edges and screwthreaded projections 63 and 64 extending from the central portion thereof are then placed in position, the screwthreaded projections engaging the screwthreads of the socket members 50 and 51, as shown, and the flanges neatly fit the circumferential grooves in the ends of the porcelain cover, as shown.

In Fig. 5 is shown a modification of the invention, the "electrose" body, stress distributing members and holding elements being of any suitable construction, but preferably that which is shown and described with respect to Fig. 1.

The difference in construction shown in Fig. 5 and that shown in Fig. 1 lies in the fact that there is a glass tube 95 substantially the shape and form of the porcelain tube 100 which lies intermediate of the "electrose" body and the porcelain cover, the glass tube being separated from the porcelain cover by an insulating filling material 93, and it is also separated from the surface of the "electrose" body by a like insulating filling material 94. It is obvious that instead of the glass tube another tube of similar heat resisting and insulating material may be substituted therefor, or two porcelain tubes may be utilized. The insulating materials of the composite strain insulator shown consist, as it were, of layers of porcelain or glass, a plurality of layers of insulating cement and a central body of "electrose" or similar material. This construction results in distributing the stresses both electrical and mechanical.

As changes of construction could be made within the scope of my invention, it is intended that all matter contained in the above

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description or shown in the accompanying drawing 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. A device of the kind described which comprises a core of insulating material having grooves and ridges formed in its outer surface, a tube of heat resisting material encasing said core and having grooves and ridges on its inner surface, an insulating cement filling the space between said core and said tube, and strain members attached directly to the ends of said core.

2. A device of the kind described which comprises a core of insulating material having an undulated outer surface and provided with strain members molded in the body thereof one at each end, the said strain members projecting therefrom, a tube of heat resisting material having an undulated inner surface surrounding and spaced from the undulated outer wall of said core, a filling of insulating cement between said core and the inner wall of said tube and covering caps rigidly held to the ends of said core and supporting said tube.

3. In a device of the kind described, a composite insulator consisting of a body of insulating material, the surface thereof having undulations therein, a tube of insulating heat resisting material surrounding said body, the surface of the inner walls of the tube also having undulations therein, an insulating cement comprising a layer of insulating material filling the space between the surface of the insulating body and the inner wall of the heat resisting tube, said cement operating to secure the inner insulating body and the outer tube to each other, the body and the tubular heat resisting cover being of the same length, stress distributors embedded in said body of insulating material and having threaded ends projecting beyond the ends of said body, and metallic discs rigidly secured to the connecting ends of said stress distributors, having suspension eyes integrally formed thereon.

4. In a device of the kind described, a composite insulator the core of which consists of a solid body of insulating material provided with a series of circular grooves on the surface thereof, a heat resisting cover of insulating material for the same of the same length as said core, the inner wall thereof provided with a series of grooves, and a stratum of insulating material surrounding the core, filling the grooves and securing the heat resisting cover to the insulating body and flat non-circular discs of metal protecting the ends of said insulator elements, said discs having stress distributors secured thereto and extending into said core and means formed on said discs for securing the insulator to the suspension cable.

In witness whereof, I have hereunto set my hand at the borough of Manhattan, city and State of New York, this 22 day of July, 1918.

LOUIS STEINBERGER.

In presence of—
HAROLD CROCHERON,
ZITA M. GRAHAM.