L. STEINBERGER.

INSULATOR.

APPLICATION FILED APR. 17, 1914.

1,156,442.

Patented Oct. 12, 1915.

2 SHEETS—SHEET 1.

Fig. 1.

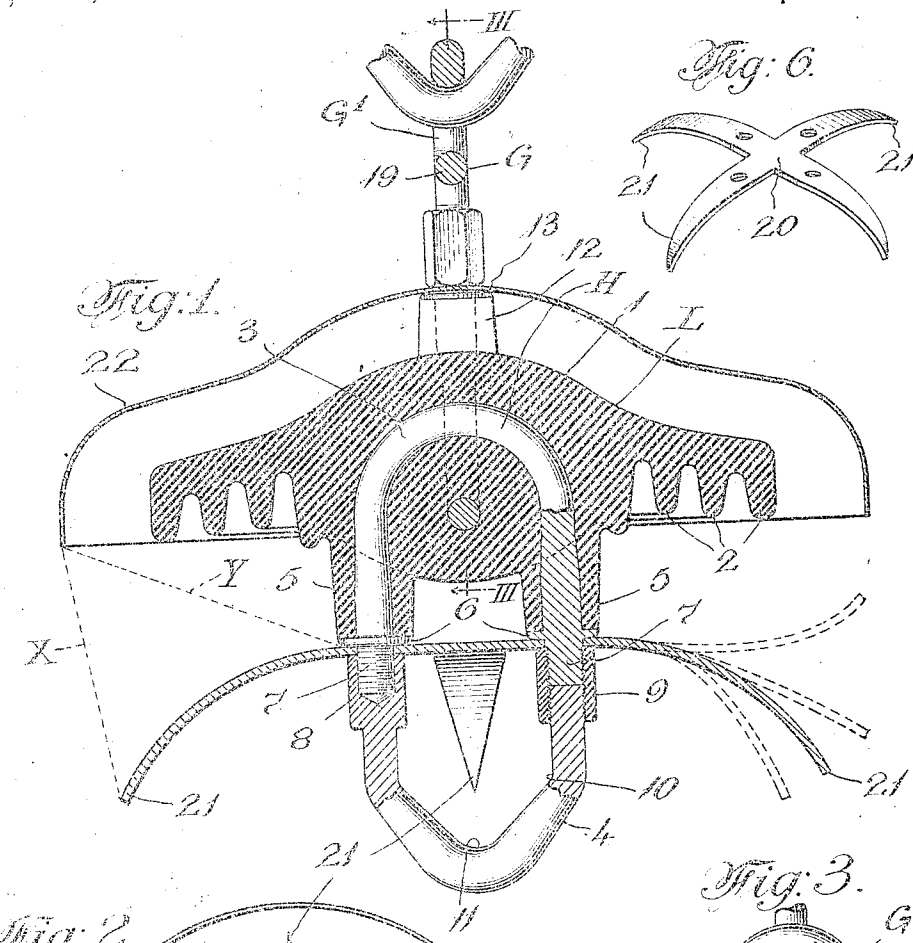


Fig. 6.

Fig. 2.

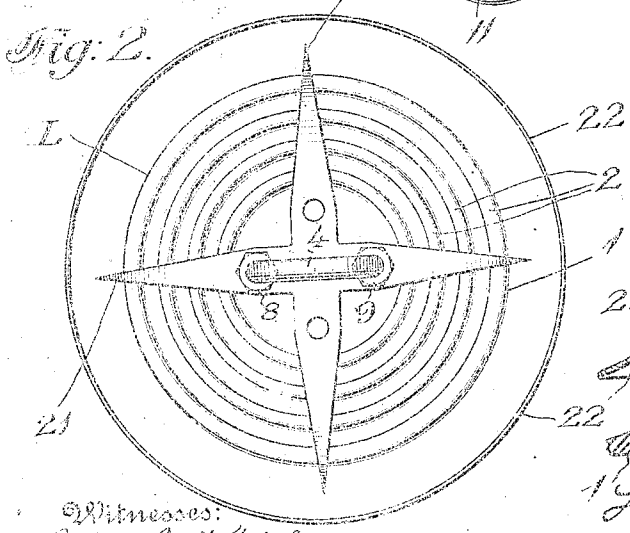
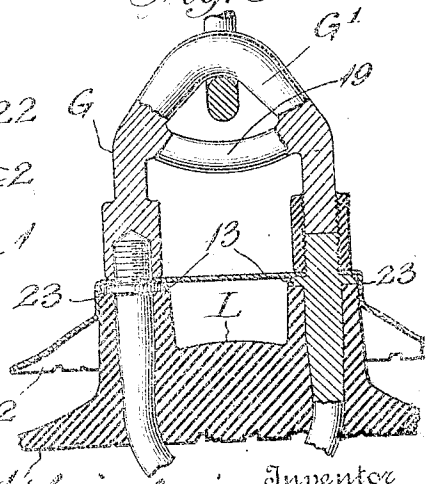


Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 4.

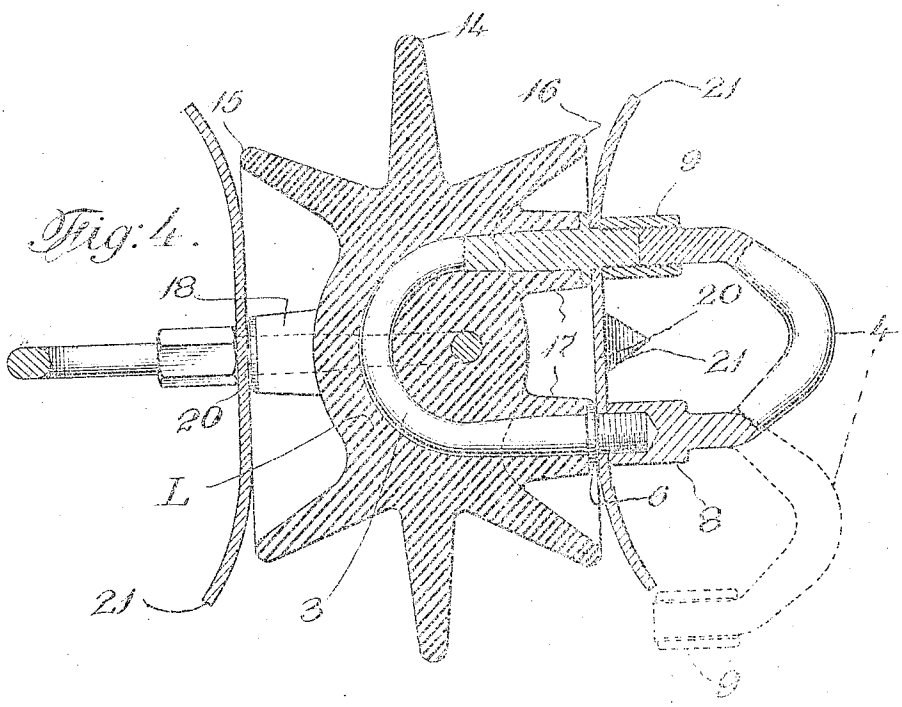
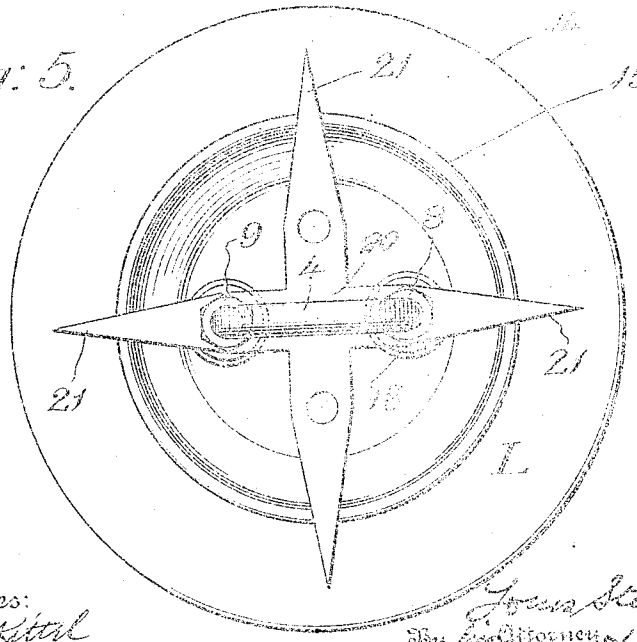


Fig. 5.



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UNITED STATES PATENT OFFICE.

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INSULATOR.

1,156,442. Specification of Letters Patent. Patented Oct. 12, 1915.

Application filed April 17, 1914. Serial No. 832,616.

To all whom it may concern:

Be it known that I, LOUIS STEINBERGER, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Insulators, of which the following is a specification.

This invention relates to an insulator construction, and the principal object thereof is to provide an efficient reliable structure adapted for use as a strain insulator, either for dead-ending or like purposes, or for a suspension insulator, and to render the parts thereof of such form as to be cheaply manufactured and assembled.

Another object is to improve the construction of the strain members so that a series of insulators may be connected in chain relation without the interpositioning of special connecting members, and to provide ample and efficient protection for the strain members, both mechanically and electrically, without unnecessarily increasing the amount of insultaing material employed.

Another object is to provide insulators of the type described which may be handled and assembled without danger of chipping or breaking the material of which the insulator is constructed.

A further object is to provide, in an insulator having spaced strain members projecting from one surface thereof, and a U-shaped member attached by its opposite legs to said strain members surving as a supporting means and having a tendency to move said legs toward each other when strain is applied thereto, a brace member extending between said strain members to resist the tendency of the U-shaped member to move the strain members toward each other.

A further object is to provide the brace member so as to afford a desired amount of protection to the body of the insulator especially from blows such as might be dealt upon the insulator by a member held between the legs of the U-shaped member and subject to movement toward the body of the insulator incident to handling of the insulator or to violent sway thereof in a heavy wind, or to other causes.

A further object is to provide a brace member as a separately formed part held in position by the presence of the U-shaped member and being detachable when said U-shaped member is removed.

A further object is to provide one or more arcing members, preferably one at each side of the insulator and having metallic connection with the strain members, and projecting laterally so as to dispose portions of themselves in position to coöperate for giving definite direction to an arc which might occur across the insulator and which might otherwise be destructive to the insulator.

A further object is to provide means whereby the arcing members are adjustable.

A further object is to form at least one of these arcing members so that it will serve as a hood if desired, for protecting the insulator body, this object being particularly associated with the invention when the insulator is used as a suspension insulator; and

A further object is to arrange the arcing members so that parts thereof will comprise brace members above referred to.

Other objects and aims of the invention, more or less specific than those referred to above, will be in part obvious and in part pointed out in the course of the following description of the elements, combinations, arrangements of parts and applications of principles, constituting the invention.

In the accompanying drawings which are to be taken as a part of this specification, and in which I have shown a merely preferred form of embodiment of the invention, Figure 1 is a transverse, central, sectional view through an insulator constructed in accordance with the provisions of this invention; Fig. 2 is a bottom plan view of the structure illustrated in Fig. 1; Fig. 3 is a fragmentary sectional view taken substantially upon the plane of line III—III of Fig. 1; Fig. 4 is a view similar to Fig. 1, but illustrating the invention as applied to a strain type or dead-ending insulator, whereas the structure in Fig. 1 is more particularly a suspension insulator; though of course this structure may be used as a strain insulator also if desired. Fig. 5 is a side view of the structure shown in Fig. 4; and Fig. 6 is a detail view.

Referring to the drawings for a detailed description of the structure illustrated, and particularly to the structure of Figs. 1 and 2, the reference character L indicates generally a body of insulating material. This may be of any preferred shape or design, but, for use as a suspension insulator, is preferably formed with a horizontal disk or flange 1, said disk being preferably smooth upon its upper surface, but inclining con-

tinuously downwardly from the central portion of the body L to the outer periphery of the flange, so as to more readily shed water therefrom. A plurality of corrugations or flanges 2 may be formed upon the lower surface of the disk for preventing creepage of moisture along said lower surface of the disk toward the central portion thereof, for increasing the insulating surface of the disk and for providing protective portions.

The strain members are indicated by the reference characters G and H. These each comprise a closed loop or U-shaped portion, and are linked through each other within the body L, being held by the material of said body in spaced relation from each other a sufficient distance to effectually and completely electrically insulate them from each other, the body L being at the same time of proper proportions relatively to the size of the embedded portions of the strain members, so as to offer ample mechanical strength for resisting strains which may be applied to the strain members tending to move their insulated parts together. The strain member G is provided with a closed eye G' through which a supporting member may be inserted. The provision of this eye prevents the supporting means from ever coming in contact with the upper surface of the insulator during handling of the insulator and connecting it in the line. The strain member H is formed of two parts, an upper part 3 and a lower part 4. The part 3 comprises a U-shaped metallic member having the connecting portion between its spaced legs rigidly embedded within the body L, and having its legs extending downwardly from the body L and through a pair of sleeves or extensions 5 formed upon the under-surface of the body, and being of sufficient length to reach to near the lower ends of the legs. Adjacent to the end of each of the legs, said legs are formed with an annular flange 6 overlying and reinforcing the ends of the sleeves or extensions 5. The legs project beyond the flange 6, as at 7. The part 4 likewise comprises a U-shaped metallic member, but is arranged in an inverted position, having its opposite legs disposed with their ends substantially abutting the projecting ends 7 of the legs of the part 3.

The adjacent legs of the two parts 3 and 4 may be connected in any approved manner, but are preferably connected by the means shown, which means consists of a threaded socket 8 formed upon one leg of the part 4 for engaging with threads provided upon the projecting part 7 of the adjacent leg of the part 3 by bodily interrotation between said parts, and of a separately formed sleeve 9 engaging threads upon the other leg of the part 4, and extending into engagement with threads provided upon the portion 7 of the remaining leg of the part 3. The sleeve 9 is rotatable to travel along the leg of the part 4 to free itself from engagement with the threads of the part 7, so that the part 4 may be rotated bodily as suggested.

The flange 6 upon one leg of the part 3 is engaged by the upper edge of the socket 8 to limit movement of the socket in a position where the opposite leg of the part 4 is in a horizontal plane to properly engage with the remaining leg of the part 3. The flange 6 of said remaining leg of the part 3 serves to limit upward movement of the sleeve 9, and to thereby determine the position of said sleeve for properly and uniformly engaging the adjacent legs of the parts 3 and 4.

The part 4 is bent abruptly at a point slightly below the sleeve 9 so as to form a shoulder 10 with which said sleeve may engage to limit the downward movement of the sleeve when the parts are being disengaged. The shoulder is preferably in such position as to prevent downward movement of the sleeve beyond a point where the upper edge of the sleeve is substantially flush with the upper end of the leg upon which it is mounted.

The connecting portion between the legs of the part 4 is preferably bent into substantially V-shape, so as to provide a centrally located positively defined seat 11 for engagement by a cable, or by a connecting member or link of another insulator. The central portion is preferably thickened, and the opposite sides of the V are tapered outwardly. By this means the spaced legs of the part 4 are more rigidly and permanently spaced, and are less liable to be drawn toward each other by strains applied within the seat 11. The connecting portion between the legs of the part 3 is preferably formed on an arc of a circle, so as to give a broad and substantial contact with the insulating material of the body L, and thus also assist in resisting strains tending to move the legs toward each other.

The other strain member, as G, illustrated may be a two-part structure, as illustrated, and as described for the strain member H, or it may be formed as an integral closed link, if preferred, according to convenience or requirement. The body portion L is preferably provided with a pair of sleeves 12 upstanding therefrom, corresponding legs of the strain member G being extended through said sleeves and being provided with annular flange 13 engaging and reinforcing the upper ends of the sleeves in the same manner as described for the sleeves 5.

The insulating material employed in the structure illustrated is preferably "Electrose."

In use, the operator, in order to open the strain member, H, has merely to rotate the sleeve 9 downwardly to the shoulder 10, and swing the part 4 bodily about the threaded portion of the other leg of the part 3. When closing the strain member he rotates the part 4 upwardly until rotation is arrested by engagement of the socket 8 with the adjacent flange 6 and return the sleeve 9 upwardly, the whole operation consuming very little time and being positive throughout. Little or no dependence is made upon the intelligence of the operator because each of the steps in the operation is positively defined by parts formed upon the insulator structure.

In the modification, Figs. 4 and 5, the construction and arrangement of the strain members within the body of insulating material is identical with that above described. This structure, however, illustrates the manner of adapting these features to use as a dead-ending or strain insulator, that is, an insulator intended to be used with the longitudinal axes of the strain members extending in or near a horizontal plane rather than in or near a vertical plane, as with the structure above described. In these figures the body portion L is shown to be provided with an annular disk or flange 14 centrally disposed between a pair of annular oppositely obliquely disposed flanges or collars 15 and 16. These projecting parts all increase the insulating surface between the opposing strain members, and the flange or collar 15 is as effective for presenting a water-protected surface at one side of the body adjacent one of the strain members as is the flange or collar 16 for presenting a water-protected surface at the other side of the body adjacent the other strain member while the longitudinal axes of the strain members extend horizontally, as shown and described in my Patent No. 904,370. The sleeves 17 and 18 of these figures, corresponding with the sleeves 5 and 12 of Figs. 1 and 2, project outwardly from opposite sides of the body L within the areas of the opposite surfaces of the body defined by the flanges or collars 15 and 16, so that said flanges or collars overlap said sleeves and serve to protect them particularly from direct attack of falling rain.

In Fig. 3 it will be noted that the cross brace 19 for forming the closed eye G′ serves to positively prevent movement of the legs of the strain members toward each other when strain is applied within the eye. Where, however, the strain member is of two parts, as illustrated, the same result may be accomplished by the presence of a cross brace, as 20, extending between the legs of the strain member. These braces may be formed integral with the parts 3, and comprise continuations of the flanges 6, if desired, but they are preferably separately formed and are apertured to telescope over the portions 7 as indicated. When the parts are assembled the brace is clamped rigidly between the flanges 6 and the upper ends of the socket 8 and sleeve 9. Its presence protects the body of the insulator from blows which might otherwise be dealt particularly by a supporting member in the seat 11. It is also impossible for the legs of the strain member to move toward, or away from, each other and thus likelihood of fracture of the sleeves 5 is avoided.

While the members 20, may of course, each comprise simply a rectangular piece of material apertured at its opposite ends to serve no other purpose than to brace the legs of the strain members, it is preferable, however, to form the same with arms 21 projecting laterally in various directions. Two such arms are sufficient, preferably however four are employed and arranged as indicated. These project outwardly and may be turned slightly away from or toward the insulator body so as to present relatively extensive surface portions to the arms as will be readily understood from the drawings. The brace members 20, with their arms 21, thus may be referred to as arcing members.

When the invention is used as a suspension insulator, as in Figs. 1 to 3, the upper arcing member is preferably formed into a hood shape, as at 22, depending about the insulator body so as to protect the same. The insulator body may be described as being nested within the arcing member or hood 22. The under surface portion of the arcing member or hood 22 is preferably shaped to correspond to the upper surface portion of the body of the insulator and is spaced thereupon so as to provide an air space between the hood and the insulator of substantially uniform depth throughout. It will, of course, be understood that the lower annular edge of the hood 22 is spaced a proper distance from the arms 21 of the arcing member beneath it, so that the full insulating value of the body of the insulator is retained, the distance however being gaged so as to offer an opportunity for a harmless arc to the arms 21 only when the limit of safety for the insulator body is reached. It will also be understood that the distance from the lower annular edge of the hood 22 to the outer ends of the arms 21, as indicated by line X, is less than the distance to the strain members, as indicated by the line Y. Thus an arc is induced to form between the hood and the arms 21, rather than directly between the hood and the strain members. The destructive force of the arc is thus diverted to ground before reaching the insulating material, particularly of the sleeves through which the strain members pass.

The parts 23 of the hood 22, being bent closely about the insulating sleeves, obviously serve to reinforce said sleeves and protect them against likelihood of injury.

As suggested by the dotted lines in Fig. 1, it is intended that the arms 21 may be adjusted by bending or otherwise, to meet varying requirements. They may be made in any other desired shape, and also they may be formed independently of the brace members 20, if desired, and be attached to the insulator structure in any approved manner.

As many changes could be made in this construction without departing from the scope of the following claims, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative only and not in a limiting sense.

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

1. An insulator formed of a body portion of insulating material, a pair of spaced metallic parts projecting from one surface of said body portion providing attaching means for the insulator, sleeves formed upon and projecting from said body portion through which said metallic parts extend, a member extending between said metallic parts U-shaped to form a single seat between the ends of said sleeves for attaching a support, and means for attaching a conductor to said insulator.

2. An insulator formed of a body portion of insulating material, a pair of spaced metallic parts projecting from one surface of said body portion providing attaching means for the insulator, sleeves formed upon and projecting from said body portion through which said metallic parts extend, said metallic parts having flanges adjacent their ends overlying the ends of said sleeves serving to protect the ends of said sleeves, means connected to said metallic parts beyond the flanges thereon and extending therebetween so as to serve as a seat between said metallic parts for the attachment of a support, said seat forming means having portions to detachably engage over said metallic parts into engagement with said flanges whereby said seat forming means is rendered detachable, and means for attaching a conductor to said insulator.

3. An insulator formed of a body portion of insulating material, having a pair of sleeves formed integral therewith and projecting from one surface thereof, a U-shaped strain member partly embedded in said body portion having its legs projecting outwardly therefrom through said sleeves, a U-shaped connecting member extending between and connecting the legs of the strain member beyond said sleeves providing a seat serving as attaching means for the insulator, flanges formed upon said legs of the strain member overlapping a portion of said sleeves to protect said sleeves, a cross bar extending between the legs of the connecting member to protect the surface of the insulator intermediate the sleeves, and a second strain member projecting from the opposite surface of the insulator.

4. An insulator formed of a body portion of insulating material, having a pair of sleeves formed integral therewith and projecting from one surface thereof, opposed U-shaped strain members partly embedded in said body portion, one of said strain members having its legs projecting outwardly from the body portion through said sleeves, means extending between and connecting said legs beyond said sleeves serving as attaching means for the insulator, and a flange projecting from said body portion surrounding said sleeves to protect said sleeves.

5. An insulator formed of a body portion of insulating material, a pair of spaced metallic parts projecting from one surface of said body portion providing attaching means for the insulator, sleeves formed upon and projecting from said body portion through which said metallic parts extend, a brace bar extending between said metallic parts adjacent the outer ends of said sleeves, said brace bar being spaced from the surface of the insulator body intermediate the sleeves and serving to protect said portion of the insulator body, and means for attaching a conductor at the opposite surface of the body.

6. An insulator formed of a body portion of insulating material, a pair of spaced metallic parts projecting from one surface of said body portion providing attaching means for the insulator, sleeves formed upon and projecting from said body portion through which said metallic parts extend, a brace bar extending between said metallic parts adjacent the outer ends of said sleeves, a member connected to the projecting portions of said metallic parts beyond said brace bar, said member providing a seat intermediate the projecting portions of the metallic parts within which a support for the insulator may rest, said brace bar being disposed intermediate said seat and the adjacent surface of the insulator body but spaced from said surface of the insulator body to protect the same, and means for attaching a conductor at the opposite surface of the body.

7. An insulator formed of a body portion of insulating material, a pair of spaced metallic parts projecting from one surface of said body portion providing attaching means for the insulator, a separately formed brace bar extending between said metallic parts adjacent their outer ends, a seat forming member connected to the projecting portions of the metallic parts, engaging said

brace bar to retain said brace bar in bracing position, and means for attaching a conductor at the opposite surface of the body.

8. An insulator formed of a body portion of insulating material, a pair of spaced metallic parts projecting from one surface of said body portion providing attaching means for the insulator, a separately formed brace bar extending between said metallic parts adjacent their outer ends having parts telescoping over the projecting portion of said metallic parts, a seat forming member connected to the projecting portions of the metallic parts serving to retain said brace bar in bracing position, and means for attaching a conductor at the opposite surface of the body.

9. An insulator formed of a body portion of insulating material, a pair of spaced metallic parts projecting from one surface of said body portion providing attaching means for the insulator, sleeves formed upon and projecting from said body portion through which said metallic parts extend, said metallic parts having flanges adjacent their ends overlying the ends of said sleeves serving to protect the ends of said sleeves, means connected to said metallic parts beyond the flanges thereon extending therebetween so as to serve as a seat for the attachment of a support, and a separately formed brace bar extending between said metallic parts and engaging said metallic parts between said flanges and said seat forming means, and means for attaching a conductor at the opposite surface of the body.

10. An insulator formed of a body of insulating material, spaced strain members projecting from one surface thereof, means forming a seat between them beyond said surface, a protecting plate carried by said body adjacent said seat to protect said body, and means for attaching a conductor at the opposite surface of the body.

11. An insulator formed of a body portion of insulating material, a pair of spaced metallic parts projecting from one surface of said body portion providing attaching means for the insulator, sleeves formed upon and projecting from said body portion through which said metallic parts extend, an arcing member supported at the outer ends of said sleeves, and means for attaching a conductor at the opposite surface of the body.

12. An insulator formed of a body portion of insulating material, a pair of spaced metallic parts projecting from one surface of said body portion providing attaching means for the insulator, a member extending between said metallic parts to form a seat beyond the ends thereof for attaching a support, said member being separately formed and being adjustable to form a clamp with said metallic parts, an arcing member supported in said clamp, and means for attaching a conductor at the opposite surface of the body.

13. An insulator formed of a body portion of insulating material, having a pair of sleeves formed integral therewith and projecting from one surface thereof, a pair of spaced metallic parts partly embedded in said body, said metallic parts having end portions projecting outwardly from the body through said sleeves, means extending between and connecting the projecting end portions beyond said sleeves serving as attaching means for the insulator, an arcing member also extending between and connecting the projecting end portions beyond said sleeves, said arcing member being formed with a plurality of arms thereon projecting laterally outward from said sleeves, and means for attaching a conductor at the opposite surface of the body.

14. An insulator formed of a body portion of insulating material, having a pair of sleeves formed integral therewith and projecting from one surface thereof, a U-shaped strain member partly embedded in said body portion having its legs projecting outwardly therefrom through said sleeves, means extending between and connecting said legs beyond said sleeves serving as attaching means for the insulator, a flange projecting from said body portion surrounding said sleeves to protect said sleeves, an arcing member carried by said legs having portions extending outwardly from said legs into proximity to said flange, and means for attaching a conductor at the opposite surface of the body.

15. An insulator formed of a body portion of insulating material, a pair of spaced metallic parts projecting from one surface of said body portion providing attaching means for the insulator, sleeves formed upon and projecting from said body portion through which said metallic parts extend, a member supported at the outer ends of said sleeves comprising a hood having parts extending over the insulator body to protect said body, and means for attaching a conductor at the opposite surface of the body.

16. An insulator formed of a body portion of insulating material, a pair of spaced metallic parts projecting from one surface of said body portion providing attaching means for the insulator, sleeves formed upon and projecting from said body portion through which said metallic parts extend, a hood shaped arcing member supported at the outer ends of said sleeves spaced from the insulator body having parts extending over the insulator body to protect said body, and means for attaching a conductor at the opposite surface of the body.

17. An insulator formed of a body portion

of insulating material, a pair of spaced metallic parts projecting from one surface of said body portion providing attaching means for the insulator, sleeves formed upon and projecting from said body portion through which said metallic parts extend, a hood shaped arcing member supported at the outer ends of said sleeves having parts extending over the insulator body and depending thereabout so that the insulator body is nested within said hood shaped arcing member, and means for attaching a conductor at the opposite surface of the body.

18. An insulator formed of a body portion of insulating material, having a pair of sleeves formed integral therewith and projecting from one surface thereof, a U-shaped strain member partly embedded in said body portion having its legs projecting outwardly therefrom through said sleeves, means extending between and connecting said legs beyond said sleeves serving as attaching means for the insulator, an arcing member also extending between and connecting said legs beyond said sleeves, said arcing member having portions bent laterally against the sides of said sleeves to protect said sleeves, and means for attaching a conductor at the opposite surface of the body.

19. An insulator formed of a body portion of insulating material, strain members projecting from opposite sides thereof, and a pair of arcing members carried one by each of said strain members having parts projecting laterally outward from said strain members, and the laterally projecting parts of the arcing member at one side of said insulator body having outer end portions bent away from the outer end portions of the arcing member at the other side of the insulator body.

20. A disk insulator formed of a disk-shaped body portion of insulating material having reduced extensions projecting from opposite surfaces thereof, attaching means projecting from said extensions, and arcing members supported upon said extensions.

21. A disk insulator formed of a disk-shaped body portion of insulating material having reduced extensions projecting from opposite surfaces thereof, attaching means projecting from said extensions, and arcing members carried at the outer ends of said extensions being retained by said attaching means.

22. An insulator formed of a body portion of insulating material, means for attaching conductors at the opposite sides of said body, a pair of arcing members arranged one at each side of said body, and the arcing member at one side of the body having parts thereof disposed for receiving the arc being curved away from the corresponding portion of the arcing member at the other side of the body.

23. An insulator formed of a body portion of insulating material, a pair of spaced metallic parts projecting from one surface of said body portion providing attaching means for the insulator, means for attaching a conductor at the opposite surface of the body portion, sleeves formed upon and projecting from said body portion through which said metallic parts extend, a brace bar extending between said metallic parts adjacent the outer ends of said sleeves, and said brace bar having a plurality of arms formed thereon projecting outwardly away from said metallic parts, said arms being bendable for the purpose set forth.

24. An insulator formed of a body portion of insulating material, strain members projecting from opposite sides thereof, a pair of arcing members one carried by each of said strain members spaced from said body portion, and one of said arcing members having portions bendable toward and away from the other of said arcing members.

25. An insulator formed of a body portion of insulating material, strain members projecting from opposite sides thereof, a pair of arcing members carried by said strain members having parts projecting laterally outward from said strain members, one of said arcing members comprising a hood for protecting the insulator body, and the other of said arcing members having parts bendable toward and away from said hood.

In testimony whereof, I affix my signature in the presence of two witnesses.

LOUIS STEINBERGER.

Witnesses:

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LEO M. EISENBERG.