Sept. 4, 1934. A. O. AUSTIN 1,972,616

ELECTROSTATIC SHIELD

Filed Feb. 25, 1931

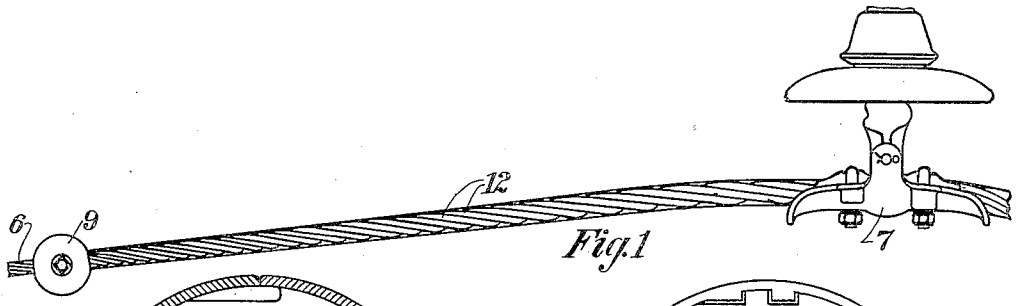


Fig. 1

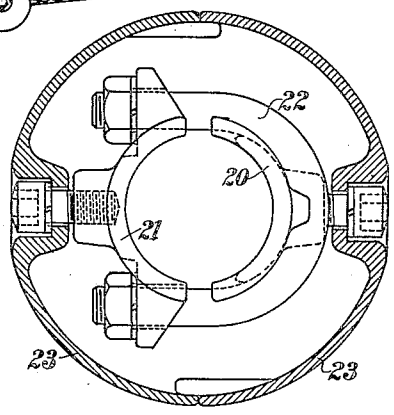


Fig. 4

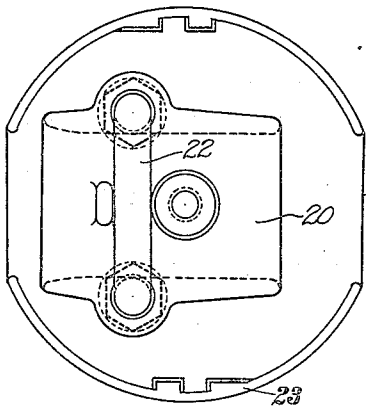


Fig. 5

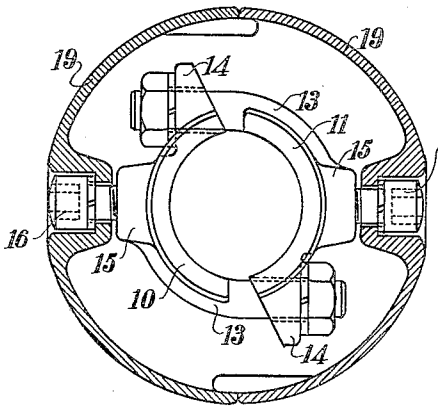


Fig. 2

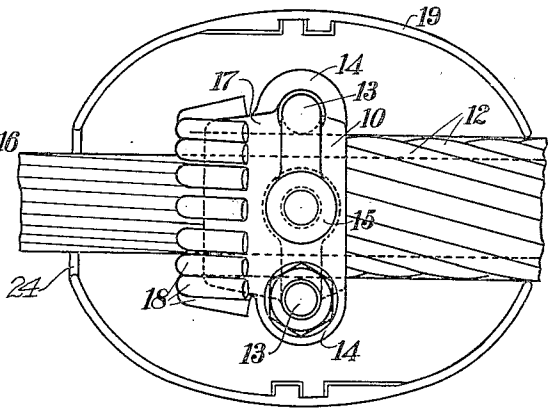


Fig. 3

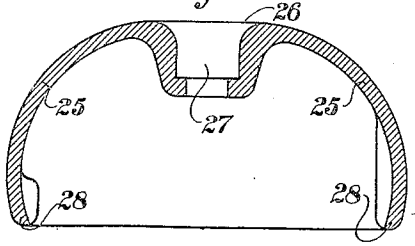


Fig. 6

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Patented Sept. 4, 1934

1,972,616

UNITED STATES PATENT OFFICE

1,972,616

ELECTROSTATIC SHIELD

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Application February 25, 1931, Serial No. 518,090

12 Claims. (Cl. 173—251)

This invention relates to combined clamps and shields for conductors and has for one of its objects the provision of means for clamping the ends of protecting rods for conductors and for shielding the rod ends and clamp to prevent electrical discharges.

Another object of the invention is to provide a device of the class named which shall be economical to manufacture and easy to install.

A further object of the invention is to provide a combined clamp and shield which shall be 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 showing a conductor equipped with one form of the present invention.

Fig. 2 is a vertical section of a combined clamp and shield made according to one form of the invention.

Fig. 3 is a side elevation of the device shown in Fig. 2 with one of the shield sections removed.

Figs. 4 and 5 are views similar to Figs. 2 and 3 respectively, showing a modified form of the invention.

Fig. 6 is a section of a slightly modified form of shield member.

In order to avoid crystallization of the conductors in high voltage transmission lines and to protect the conductors from arcs, it is frequently customary to wrap the power conductors with a series of rods. In some installations the rods are tapered and twisted around the main conductor. To hold the rods in place at their extremities, clamps have been used of various forms. Such clamps to be satisfactory at high voltages should not cause electrical discharge to take place, especially as such discharge is apt to cause radio interference. In general, clamps which are most suitable from the mechanical standpoint are likely to be poor from the electrical standpoint producing discharge from irregular surfaces at high voltage.

The present invention provides a clamp which fulfills both the electrical and mechanical requirements and is easily installed. In general, the clamp is made up in two parts; a central part, providing the clamping means, and an outer shell which will screen the rough projections of the clamp.

In Fig. 1 the conductor 6 is protected by rods 12 held by the suspension clamp 7 carried on a supporting insulator 8. At the ends of the rods 12 there is provided a combined clamp and shield designated generally by the numeral 9.

In the form of the invention shown in Figs. 2 and 3, complementary clamping members 10 and 11 are so shaped that they may be tightened on the conductor rods 12. The clamping members have their inner surfaces shaped to fit the reinforcing rods or conductor which they grip. One edge of each clamping member is provided with a stud or bolt 13 and the other edge with an eye 14. Each member is also provided with a boss 15, into which a cap screw or bolt 16 may be screwed. In order to apply the clamp, the complementary clamping members 10 and 11 are clamped to the conductor rods 12 adjacent their ends and the ends then bent over the projecting ends 17 of the clamps, as indicated at 18 in Fig. 3. As the projecting ends 17 of the two clamps 10 and 11 may be made so as to form a complete cylinder or cone, the ends 18 may be spaced uniformly and held in position. Ordinarily the ends 18, as well as the projecting points of the clamp, would cause corona discharge at the high voltage unless some provision is made to shield these projections. In order to prevent this, shields 19 of general spherical shape are provided which may be bolted to the clamp members by cap screws 16 or other suitable means. With the arrangement shown, it is possible to grip the reinforcing rods firmly so that there will be no loose parts in contact with the rods. Where there is any looseness, vibration is likely to damage the rods or conductor. The shield members may be tightened firmly to the clamping member in such a way that they will not come in contact with the conductor or rods if desired. With this arrangement there would be no damage to the conductor even if one of the shield members became loose, as the clearance would prevent striking the conductor.

The shields 19 are provided with semi-circular notches 24 at their ends to permit passage for the conductor. Clearance is provided between the periphery of the opening and the conductor to prevent injury to the conductor but the opening may fit closely to the rods 12, as shown in Fig. 3 of the drawing.

If the shield member dropped off through loosening of the cap screw, there would be no damage other than to permit electrical discharge from the parts left unshielded. With the arrangement shown, it is possible to install the

clamps very readily, owing to the annular ring or sleeve provided, over which the ends of the rods may be bent.

Several different types of clamp members may be used but it is advisable to provide the clamping members with a projection or sleeve over which the ends of the rods may be turned. By increasing the radius of curvature for the surface of the shields 19 in the vicinity of the cap screws for holding the shields to the clamping members, it is possible to further reduce the danger of discharge, although the recess for cap screws or nuts may have rather sharp edges.

Where the combination clamp and shield is used for aluminum conductor, parts may be made of aluminum or like alloys or if desired the clamping member may be of steel or other suitable material.

As shown in Figs. 4 and 5 the clamping member may consist of bearing pieces 20 and 21 which are held together by a U-bolt 22 or other suitable means. In these figures the shields 23 are hemispherical instead of being oblong, as in Figs. 2 and 3. One method of forming the shields is to use pressed metal while the clamping members may be either of pressed metal or castings. In all cases, however, the arrangement consists of a clamping member over which the ends of the conductor may be turned and a protecting shield bolted to the clamp.

In the modified form of shield member shown in Fig. 6, the parts 25 are curved on a radius less than the part at 26 so that the surface about the opening 27 is flatter than the surface at 25, and the surface at 25 extends outwardly a greater distance than at 26 and 28. This reduces any tendency to discharge from the head of the cap screw 16 and from the edges 28.

I claim:

1. The combination with a conductor having projections thereon, of a two-part orbicular shield surrounding said projections to reduce electrical discharges therefrom, the parts of said shield being separately secured to said conductor so that if either part becomes detached it can fall away from said conductor.

2. The combination with a conductor, of a two-part clamp secured to said conductor, and a two-part orbicular shield surrounding said clamp, the parts of said shield being separately attached respectively to the parts of said clamp.

3. The combination with a conductor, of protective rods disposed about the outer surface of said conductor, a two-part clamp gripping said rods adjacent the ends thereof and having extensions at the side thereof adjacent the ends of said rods, said extensions forming a substantially continuous collar surrounding said rods, the ends of said rods being bent backwardly over the edge of said collar, means for tightening the parts of said clamp firmly about said rods, and a spheroidal shield surrounding said clamp and the ends of said rods and having the elongated axis thereof extending in the direction of the axis of said conductor.

4. The combination with a conductor having rods extending along a portion of said conductor and wound about the outer surface of said conductor, of a two-part clamp for holding the ends of said rods, means for tightening the parts of said clamp about said rods adjacent the ends thereof, said clamp having a substantially continuous collar projecting toward the ends of said rods, the ends of said rods being bent backwardly over the edge of said collar, an orbicular shield of conducting material made in two parts and having the parts detachably secured to the respective parts of said clamp, said shield when assembled having openings to permit the conductor to extend therethrough, the periphery of said opening being spaced away from the portion of said conductor not protected by said rods.

5. The combination with a conductor having protecting rods thereon, of a two-part clamp for holding the ends of said rods, and a two-part shield member for preventing discharge from said clamp and rods, the parts of said shield member being attached to the parts of said clamp respectively.

6. A shield member for a charged conductor comprising a shell having a convex surface and having a break in said surface, the portion of said surface adjacent said break being flattened so that other portions of said surface extend outwardly a greater distance than the portions adjacent said break.

7. The combination with a conductor, of a plurality of rods extending along the outer surface of said conductor to deaden vibrations thereof and terminating at substantially the same position along said conductor, a two-part clamp engaging said rods adjacent the ends thereof, means for securing the parts of said clamp together to clamp said rods to said conductor, the ends of said rods being bent backwardly over the edge of said clamp and forming outwardly directed points, and a two-part orbicular shield of conducting material enclosing said clamp and the ends of said rods to shield the ends of said rods, and prevent electrical discharge therefrom, the parts of said shield being separately secured to said clamp.

8. An attachment for securing the ends of reinforcing rods to an electrical conductor comprising a split clamp, means for securing the sections of said clamp together to clamp said rods to said conductor, and a flux control member for surrounding said clamp when placed on said conductor, said flux control member comprising a pair of hemi-spherical shells, and means for securing said shells to the sections of said clamp respectively after said clamp is in position on said conductor so that said shells will form a hollow orbicular casing enclosing said clamp and electrically connected with said conductor.

9. An attachment for securing the ends of reinforcing rods to an electrical conductor comprising a split clamp, means for securing the sections of said clamp together about the end portions of said rods to secure said rods to said conductor, said clamp having a flange thereon about which the ends of said rods may be bent backwardly, a flux control member comprising hemispherical shells, and means for detachably securing one of said shells to each of said clamp sections after said clamp is in place on said conductor, said shells having complementary notches therein to accommodate the portions of said conductor extending beyond said flux control member, said notches forming an aperture of approximately the same diameter as said conductor with the surrounding reinforcing rods.

10. A flux control member for application to a charged conductor comprising a shield having an orbicular surface, a headed member for securing said shield to a conductor, said shield having a pocket for receiving the head of said member, the surface of said shield adjacent the edge of said pocket being depressed relative to

the portion of the surface farther away from said pocket to screen the edge of said pocket from electrical discharge.

11. A flux control member for an electrical conductor comprising an orbicular shield, a headed member for securing said shield to a conductor, said shield having a pocket therein for receiving the head of said member, the surface of said shield adjacent said pocket being formed on a greater radius of curvature than other portions of said shield so that the surface of said other portions will be positioned farther from the center of said shield than the portion immediately adjacent the edge of said pocket.

12. The combination with a conductor, of a shield having a smooth outer surface, a clamp secured to said conductor, a threaded attaching member having a head thereon and extending through said shield and threaded into said clamp for securing said shield to said conductor, said shield having a depression in the outer surface thereof completely containing said head, said head having a non-circular opening therein to receive a tool to rotate said attaching member.

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