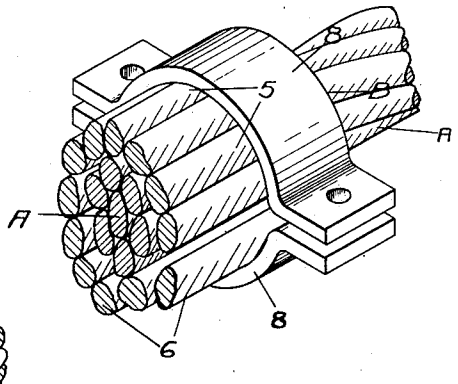
Aug. 23, 1927. 1,639,820

T. VARNEY

METHOD OF AND APPARATUS FOR PROTECTING AERIAL CABLES

Filed Sept. 16, 1924

Fig. 1



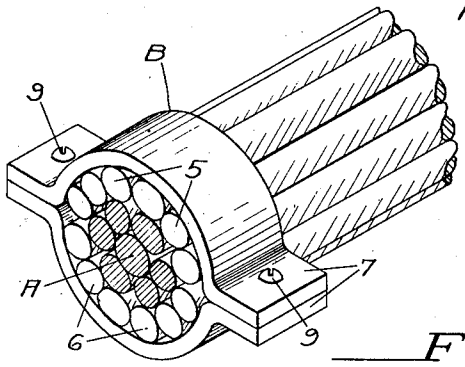




Fig. 2

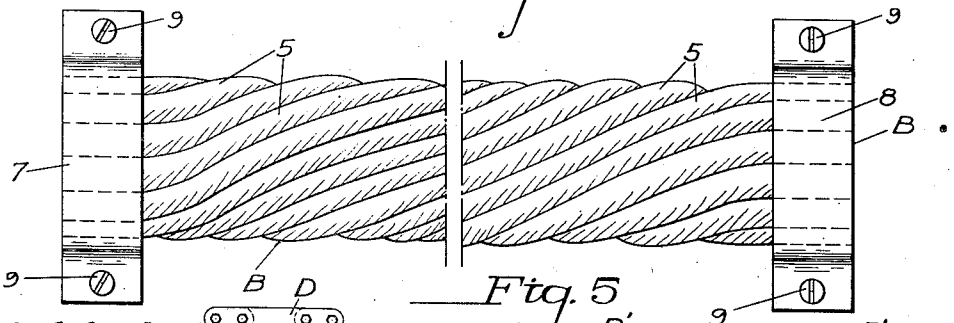



Fig. 5

Fig. 3

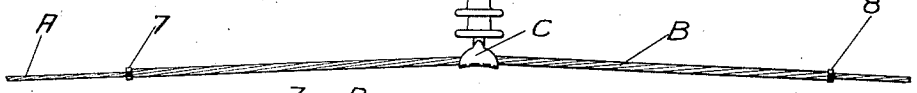
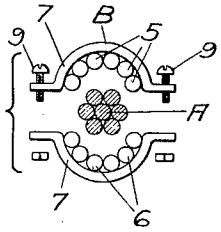



Fig. 4




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# UNITED STATES PATENT OFFICE.

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## METHOD OF AND APPARATUS FOR PROTECTING AERIAL CABLES.

Application filed September 16, 1924. Serial No. 737,990.

This invention is for a method of and apparatus for protecting aerial cables.

It is a well known fact that when a flexible wire rope or wire of any kind is suspended between two supports, it will be vibrated continuously, by air currents. Under some conditions, this vibration is negligible. Under other conditions, these vibrations have been known to break the wire, or the individual strands of a stranded cable. Sometimes this breakage has been noticed out in the span away from points of support. More frequently, however, the breakage has occurred at or near the points of support where the waves set up in the wire strike the points of support and are reflected.

The principal object of the present invention is to provide a method and means for overcoming this tendency of the cable to break at critical points, such, for instance, as at its points of suspension, which method and means may be conveniently employed in the field, at or subsequently to the time of erection of the cable, but preferably at such time.

According to the invention, it is proposed to provide on the wire or cable, at or adjacent to the point of support, or at other recognized critical points, an increase of mass, which additional mass is arranged to be mechanically attached to the cable with a maximum of convenience, and without materially increasing the rigidity of the cable itself.

The added mass, distributed along the axis of the cable and without material increase in the rigidity of the cable, is an important feature of the invention. If weights are attached to points in the cable, the desired result is not obtained for the reason that vibrations in the cable ultimately reach the weights and set them in motion. The mass of the weights stores a certain amount of energy, and in order to arrest motion of the weights, stresses are again set up in the cable between the weights and the point of support for the cable. Practical experience has proved this to sometimes be worse than if no weights were used at all.

In the practice of the present invention, a sheath of strands is applied to the cable adjacent the point of support, or at any desired known critical point, which sheath extends some distance along the cable, the strands being preferably twisted about the cable and in intimate contact therewith. These strands are preferably of the same size as the strands of the cable, and preferably form a complete layer or covering around the cable, the number of strands in the sheath preferably corresponding to the number that is ordinarily employed in the standard method of building up concentric cables.

The invention is especially useful in connection with power transmission lines, but is applicable to any aerial cable.

The invention may be best understood by reference to the accompanying drawings, which are illustrative of an embodiment of the invention, but to the details of construction of which my invention is not confined, as various changes and modifications are contemplated within the scope of my invention. In the drawings:

Fig. 1 is a perspective view of a cable having my invention applied thereto in a partially completed form;

Fig. 2 is a top plan view of the completed invention;

Fig. 3 is a side view, showing the invention applied to an electric transmission cable;

Fig. 4 is an end view of both of the two parts of the sheath;

Fig. 5 is a view similar to Fig. 3, showing the invention as used with a dead end clamp.

In the drawings, A designates the aerial cable, and B is the structure of my invention for giving the cable added mass adjacent its points of support.

According to the preferred form of the invention, the device B is formed of a plurality, preferably two, of cage sections comprised of a plurality of longitudinally extending parallel wires or strands, arranged in arcuate or semi-circular form, each wire preferably being in contact with adjacent ones. The radius of curvature for each cage section or series of wires is such that the cage may be placed concentrically on the cable. In the drawings, 5 designates the strands of one group and 6 the strands of the other group. Each group terminates at one end in a semi-circular clamp member 7, and at the other end in a similar clamp 8. The clamp member 7 of each group of wires

cooperates with the other clamp member 7, of the other group, and screws or other securing means 9, passing through lateral ears on the clamp members, may serve to connect them. In like manner, clamp members 8 cooperate with each other. The individual wires may be soldered, welded, or otherwise suitably connected with the clamp members.

In the preferred form of the invention, the strands 5 and 6 are of the same size as the strands of the cable A, and the total number of strands 5 and 6 is equal to the number which would be employed in the usual manner of building up concentric cables. For instance, if the invention is being used on a seven strand cable, having one central strand, and six surrounding ones, there will be twelve wires in cages 5 and 6 together, or six in each. The mass of the cable along the embraced portion will thus be nearly doubled.

In practicing the invention, the two cage sections are applied to the cable at the point to be protected. One set of clamps, such as 7, is set tightly on the cable, as shown in Fig. 1, while the other set 8 is left loosely connected. By the use of a suitable tool, the loose end of the sheath or cage thus formed may be rotated to twist the strands 5 and 6 to a suitable pitch, as shown in Figs. 2 and 3. Clamp 8 can then be tightly set.

On a transmission line, as shown in Fig. 3, the sheath is applied to the cable so that it extends a suitable distance, preferably three or four feet, on each side of the support C. D designates a supporting tower structure. The invention is not confined, however, to use in this particular manner or to transmission lines alone.

The principal figures of the drawing show the invention as used on a continuous cable with the strains substantially equal at each side of the support C.

When used with a "dead end" D of any standard construction, as in Fig. 5, the annular cables providing the sheath B' are clamped in the tension resisting support 10 of the dead end clamp having insulated connection with the carrier element C' for bridging across to the opposite side, as in usual practice. In such case, the sheath B' extends at one side only of the clamp, and operates in the same manner to absorb and damp the vibrations of the cable adjacent the support.

The device can be applied to the cable in the field with very little additional labor. By spiraling the strands, the protector is forced into more intimate engagement with the cable. It does not materially increase the rigidity of the cable and its mass, being effectively distributed along the cable, some distance from the point of support, absorbs and damps vibrations adjacent the support, without setting up counter stresses in the cable. Another advantage of the invention is that it materially increases the diameter of the conductor at the point of support without adding materially to the weight of the span. It is well known that high tension currents leave an abrupt curve more readily than a gradual one, and by increasing the diameter of the cable adjacent the point of support, the tendency of the current to leave the cable, that is, to ionize the air in the vicinity of the insulator and reduce its dielectric at this point, resulting in corona losses, disruptive discharges, and breakage of the insulators, is materially reduced, thereby giving additional protection to the line. This is especially true when unusual surges of current are impressed on the line above the normal load. The danger of such a flash over is greater near the insulators where the line is closest to a ground than in the span, and a flash over at this point can result in more damage than one in the span. Hence the advantage of increasing the diameter of the conductor near the support.

It will be understood that various changes and modifications may be made in the construction and application of the device within the spirit of my invention and under the scope of the appended claims.

I claim as my invention:

1. The method of protecting aerial cables from vibrations which consists in applying to a length of cable adjacent its point of support, a plurality of wires wrapped thereabout so as to materially increase the mass of the cable without materially increasing its rigidity.

2. A power transmission line including a support, an insulator string on the support, a cable suspended from the insulator string, and a plurality of wires secured to the cable in contact therewith throughout their length and extending from the insulator a relatively short distance out into the span.

3. The method of protecting an aerial cable from vibrations which consists in arranging a plurality of wires lengthwise about a relatively short length of the cable at the point to be protected, and then turning all of said wires together to wrap them about the cable and then fixing the wires to prevent their unwrapping.

4. The method of protecting an aerial cable which consists in wrapping a plurality of wires spirally thereabout, securing the wires in place, and then suspending the cable by supporting means intermediate the ends of the portion so wrapped, whereby the mass of the cable each side of the supporting means is effectively increased.

5. A protector for cables comprising a plurality of cage sections, each composed of an arcuately arranged series of wires, each series of wires having a clamp member at

each end, the respective clamp members being adapted for cooperation whereby the wires may be arranged along a cable and form a cage thereabout, said clamp members serving to secure the wires about the cable.

6. A protector for cables comprising a plurality of cage sections, each composed of a series of wires arranged side by side in an arc, and means at the ends of each cage section by means of which the sections may be clamped together around a cable.

7. The combination with an aerial cable, of means thereon for damping vibrations therein, said means comprising an annular series of wires embracing a length of the cable to be protected, said wires being spiralled about the cable and secured thereto in intimate contact therewith.

8. The combination with an aerial cable having supporting means therefor, of a sheath applied to the cable adjacent the supporting means and extending a short distance out along the span, said sheath comprising an annular series of wires arranged side by side around the cable, said wires extending longitudinally of the cable and being spiralled thereabout and in intimate contact therewith, the ends of the wires being secured to the cable.

In testimony whereof I affix my signature.

THEODORE VARNEY.