Dec. 18, 1928. 1,695,892

C. LE G. FORTESCUE

TRANSMISSION LINE DEVICE

Filed Nov. 23, 1927

Fig. 1.

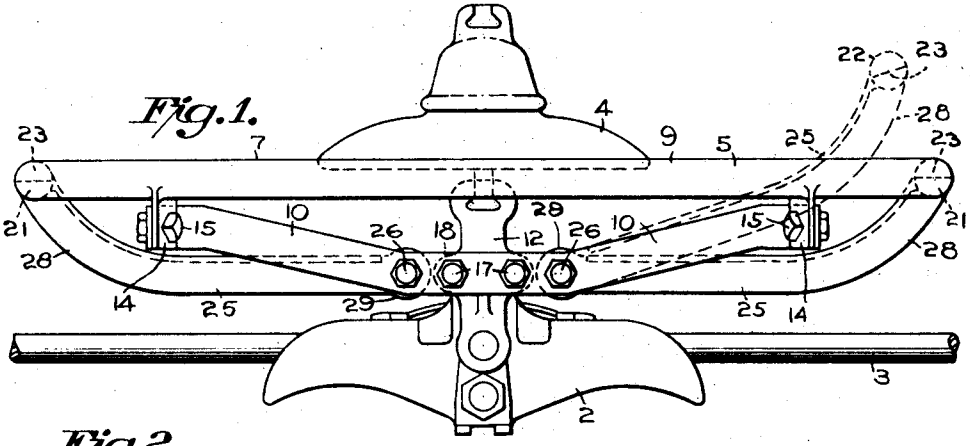


Fig. 2.

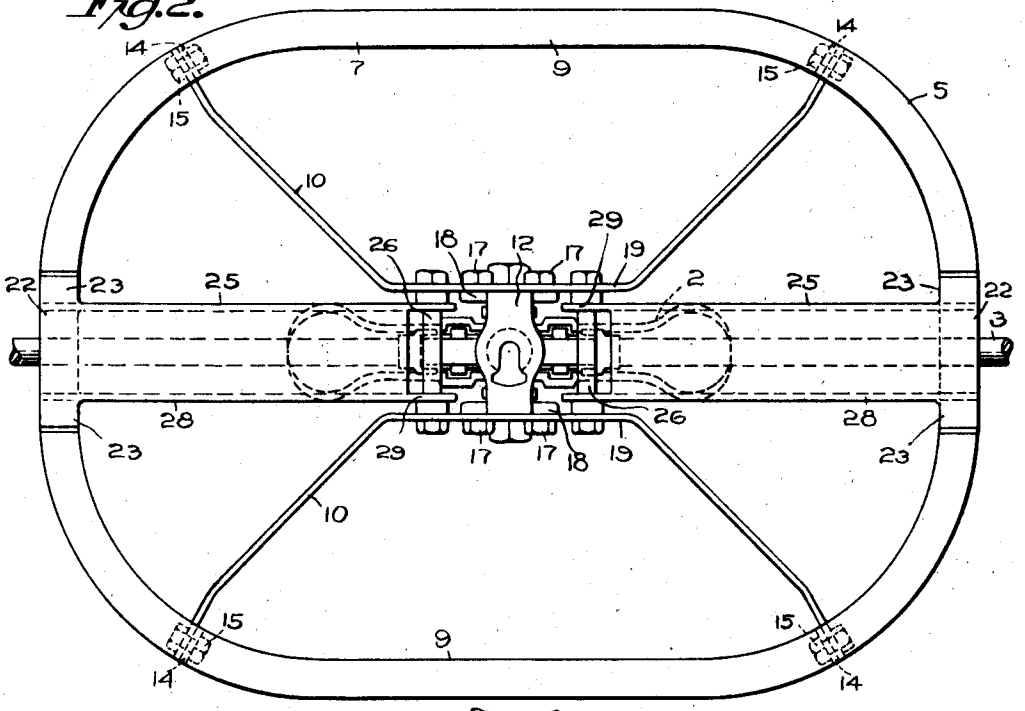
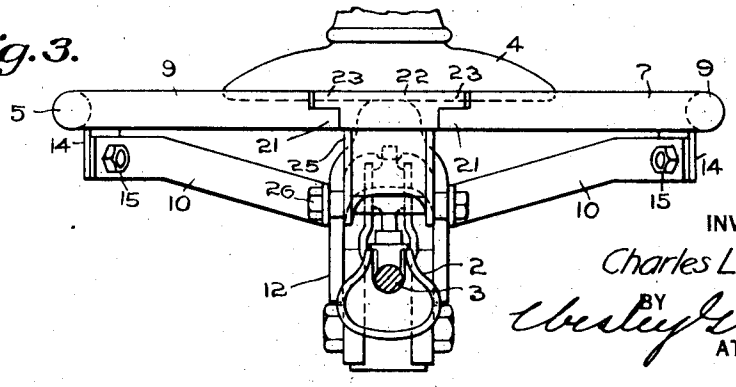


Fig. 3.



INVENTOR

Charles L. Fortescue

BY

Wesley G. Carr

ATTORNEY

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UNITED STATES PATENT OFFICE.

CHARLES LE G. FORTESCUE, OF PITTSBURGH, PENNSYLVANIA, ASSIGNOR TO WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

TRANSMISSION-LINE DEVICE.

Application filed November 23, 1927. Serial No. 235,300.

My invention relates to transmission-line devices and particularly to electrostatic-field-control structures for high-voltage suspension insulators.

One object of my invention is to provide a device of the above-indicated character that shall prevent damage thereto by engagement with the conductor, under certain operating conditions.

Another object of my invention is to provide an electrostatic-field-control device that shall have a movable section for operation by the conductor and means for preventing direct contact between the field-control portions thereof and the conductor.

A further object of my invention is to provide a transmission-line device that shall be simple and durable in construction, economical to manufacture and effective in its operation.

In transmission-line practice, particularly where very-high voltages are employed, it has been usual to employ electrostatic-field-control devices to distribute the field and to prevent damage to the insulators.

These devices are sometimes in the form of arcing horns, rings or shields that extend laterally to the insulator axis for relatively great distances in close proximity, and substantial parallelism, to the conductor or adjacent to other parts.

When, by reason of breakage of the conductor between insulators or through other cause, the insulator swings about its base-supporting end through a considerable angle from its normal operating position, the conductor or other parts sometimes engage the field-control device with sufficient force to permanently damage the same.

It is my aim to overcome the above-mentioned disadvantage, and, accordingly, in practicing my invention, I provide a field-control device that has a movable section which is not directly engaged by the conductor and which automatically returns to normal position when displaced, and that is, in general, a simple and effective structure.

Figure 1, of the accompanying drawing, is a side elevational view of a structure embodying my invention, showing one part, in broken lines, as moved to a position away from its normal operating position,

Fig. 2 is a top plan view of the device shown in Fig. 1, an insulator therefor being omitted for clearness, and

Fig. 3 is an end elevational view of the structure, as illustrated in Figs. 1 and 2.

The device comprises, in general, a suspension clamp 2 for supporting a conductor 3, an insulator 4 on which the clamp 2 is mounted, and a field-control device 5 mounted on the clamp 2.

The clamp 2 may be of any usual or well-known type, but, as illustrated, is of a type that normally securely holds the conductor 3, and, under certain abnormal conditions, permits the conductor to slip therethrough.

For a full disclosure of the clamp 2, reference may be had to co-pending application of N. A. Wahlberg, Serial No. 209,441, filed July 30, 1927, and assigned to the Westinghouse Electric and Manufacturing Company.

This clamp, not being particularly germane to this invention, as claimed, it is not believed necessary to describe it further in detail, except that, when the structure swings to the left or the right, as viewed in Fig. 1, through a certain angle, the conductor is permitted to slip to relieve tension on the parts.

The insulator 4 is of the usual and well-known suspension type which may be employed alone or with other similar units in series relation thereto and connected, at its upper end, to a main support, such as a tower or pole.

The electrostatic-field-control structure 5 comprises an upper field-control surface portion proper which may be in the form of horns extending parallel to the conductor 3 thereabove, a shield of discoidal character centrally located with respect to the insulator 4 or, as illustrated, in the form of an open-centered annular element or ring 7 of rod or tube-like formation.

The element 7, as more apparent from Fig. 2, is longer in the direction of the conductor 3 to compensate for the effect of the latter on the insulator field, but may be circular or of other contour, as viewed in Fig. 2.

The element 7 comprises normally relatively stationary side sections 9 of substantially C-shape that are connected, by sup-

porting arms 10 of substantially U-shape, to a suspension element or yoke 12 constituting a part of the clamp 2.

The supporting arms 10 are connected, at the outer ends thereof, to lugs 14 on the side sections 7, as by screws 15, and, at the inner or closed ends thereof, by screws 17, to bosses or lugs 18 on the yoke 12. The inner ends of the arms 10 are provided with substantially parallel sections 19 through which the screws 17 extend.

As shown more clearly in Fig. 3, the adjacent ends of the side section 7 may be provided with step portions 21 on which end sections 22, having similar step portions 23, normally rest.

In the positions illustrated, the sections 7 and 22 cooperate to constitute substantially a single angular or ring-like structure having uninterrupted upper and side field-control surfaces.

The end sections 22 are movably or pivotally mounted in position by members or arms 25 that preferably extend parallel to and over the conductor 3 between the latter and the plane of the section 7, to positions adjacent to the center of the structure, where they are pivoted, by means of pins 26 extending transversely to the conductor 3 between the parallel inner portions 19 of the supporting arms 10.

The arms 25 are preferably of inverted substantially channel shape having gradually curved outer end portions 28 and inner-end journal or bearing portions 29 for the pins 26.

By reason of the weight of the arms 25 and the end sections 22, the latter rest, by gravity, in the normal positions thereof in register with the side sections 9, although springs or other means may be employed tending to bias the sections 22 to such positions.

In operation, aside from the normal and usual field-controlling function thereof, when, through breakage of the conductor 3 or other cause, the conductor and the section 7 move toward each other, at either the left or the right side of the structure, as viewed in Fig. 1, the conductor engages one of the arms 25 to move the section 22, carried thereby, upwardly from its normal operative position, as indicated by broken lines in Fig. 1, and, when normal conditions are restored, the displaced section 22 is permitted to return to its normal position, as above-mentioned.

During the above action, the conductor 3 may engage one of the arms 25 inwardly beyond the curved portion 28 and ride over the latter toward the corresponding section 22 to effect a gradual approach of the conductor to the section and prevent direct impulse contact between these parts.

This operation and effect, whereby the parts are prevented from permanent distortion or damage, is in contradistinction to a usual device of this character, in which the sections 7 and 22 are rigidly connected and permit injury to the device due to engagement with the conductor.

The structure is also an improvement over former structures employing removable sections similar to the sections 22, but which are directly engaged by the conductor.

While I have shown and described a particular form of my invention, changes may be effected therein without departing from the spirit and scope thereof as set forth in the appended claims.

I claim as my invention:

1. A transmission-line device comprising an electrostatic-field-control structure including a movable section for operation by the line conductor and means operating between the section and the conductor.

2. A transmission-line device comprising an electrostatic-field-control structure including a movable section for operation by the line conductor and means operating between the section and the conductor to prevent direct impulse contact between the section and the conductor.

3. A transmission-line device comprising an electrostatic-field-control structure including a movable section for operation by the line conductor and means operating between the section and the conductor to relieve the operating force of the conductor.

4. A transmission-line device comprising an electrostatic-field-control structure including a movable section for operation by the conductor and automatically returnable to operative position, said section having less than half of the field-control surface of the structure.

5. A transmission-line device comprising an annular electrostatic-field-control element including a relatively short perimetral section opposite the line conductor pivotally mounted about an axis transverse to the conductor for movement by the conductor.

6. A transmission-line device comprising an annular electrostatic-field-control element including a relatively short perimetral section opposite the line conductor pivotally mounted adjacent to the center of the element for movement by the conductor.

7. A transmission-line device comprising an annular electrostatic-field-control element including movable sections over the conductor, side sections between said first sections, means for supporting the side sections and means pivotally mounted adjacent to the center of said element for supporting the movable sections.

8. A transmission-line device comprising an annular electrostatic-field-control element including movable sections over the

conductor, side section between said first sections, means for supporting the side sections and means pivotally mounted on said supporting means for supporting the movable sections.

9. A transmission-line device comprising an annular electrostatic-field-control element including movable sections over the conductor, side sections between said first sections, means for supporting the side sections and pivotally-mounted arms disposed over the conductor for supporting the movable sections.

10. A transmission-line device comprising an annular electrostatic-field-control element including movable sections over the conductor, side sections between said first sections, means for supporting the side sections and pivotally-mounted arms disposed over the conductor for supporting the movable sections and for engagement by the conductor to operate the movable sections.

11. A transmission-line device comprising an annular electrostatic-field-control element including movable sections over the conductor, side sections between said first sections, means for supporting the side sections and pivotally-mounted channel arms disposed over, and substantially parallel to, the conductor for supporting the movable sections.

12. A transmission-line device comprising an annular electrostatic-field-control element including movable sections over the conductor, side sections between said first sections, means for supporting the side sections, pivotally-mounted members disposed between the planes of the element and the conductor for supporting the movable sections.

13. A transmission-line device comprising an annular electrostatic-field-control element including movable sections over the conductor, side sections between said first sections, means for supporting the side sections and arms disposed over, and in substantially parallel relation to, the conductor beneath said element having inner ends pivotally mounted adjacent to the center of the device and curved outer end portions connected to said movable sections.

14. A transmission-line device comprising an annular electrostatic field-control element including spaced sections, a section pivotally-mounted on the device between said sections movable laterally relative thereto and means for positioning said sections to have definitely co-operating field-controlling surfaces.

In testimony whereof, I have hereunto subscribed my name this 21st day of November, 1927.

CHARLES LE G. FORTESCUE.