Aug. 9, 1932. F. H. MILLER 1,870,781

TRANSMISSION LINE DEVICE

Filed Aug. 22, 1928

Fig. 1.

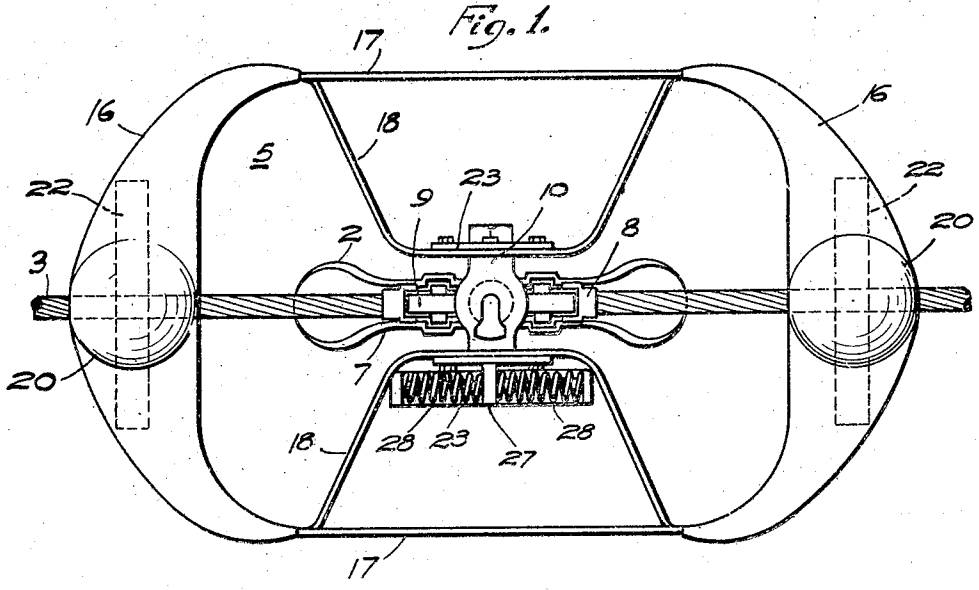



Fig. 2.

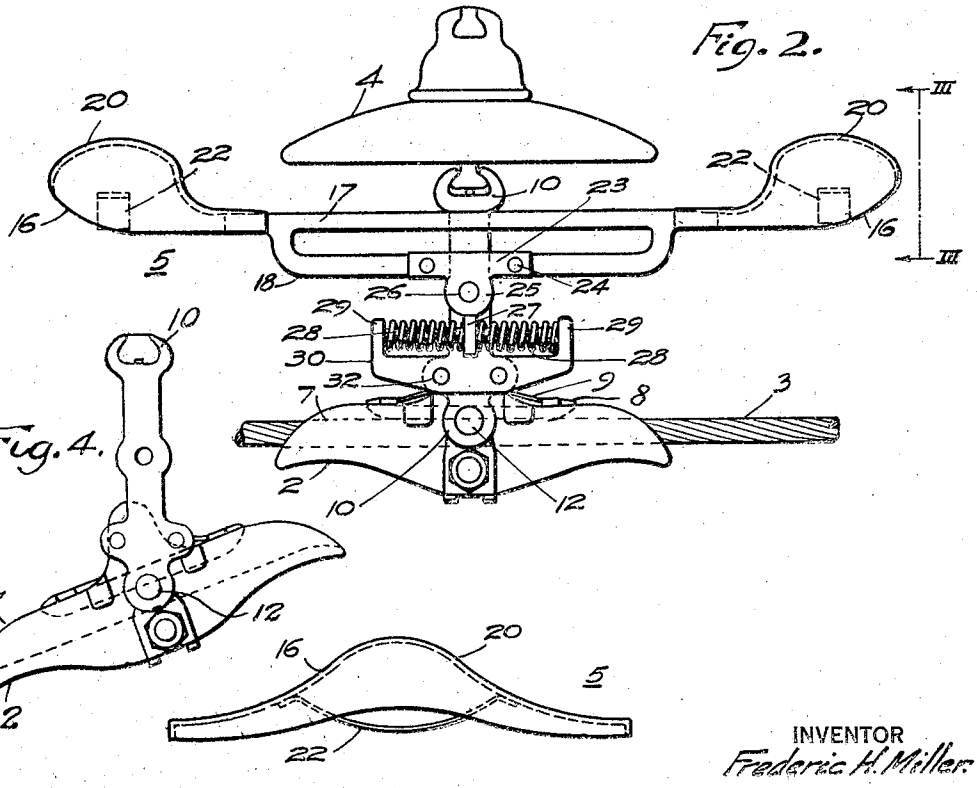



Fig. 4.







Fig. 3.

INVENTOR
Frederic H. Miller.

BY
Chesley G. Carr
ATTORNEY

Patented Aug. 9, 1932 1,870,781

# UNITED STATES PATENT OFFICE

FREDERIC H. MILLER, OF WILKINSBURG, PENNSYLVANIA, ASSIGNOR TO WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA

## TRANSMISSION LINE DEVICE

Application filed August 22, 1928. Serial No. 301,281.

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

One object of my invention is to provide a device of the above indicated character that shall be protected against damage by contact with the line conductor under certain conditions.

Another object of my invention is to provide a transmission-line device embodying an electrostatic-field-control structure that will be displaced in any one of a plurality of directions, in accordance with movement of the line conductor, to prevent damage to the structure and be automatically restored to initial operative position when the influence of the conductor movement is removed.

Another object of my invention is to provide a transmission-line device that shall be provided with shock-reducing means for preventing damage to the device by contact with the line conductor under certain conditions.

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, it has been usual to provide the insulator, adjacent to its ends, with electrostatic-field-control devices, such as arcing horns and rings.

A recent development in transmission-line practice includes a clamp which, under normal operating conditions, securely grips the conductor, but, in response to breakage of the conductor, is actuated to release the latter.

Particularly in connection with a clamp of the above-mentioned type, and also, under certain conditions in connection with a clamp of any type, by reason of the lateral extent of a field-control element disposed in parallelism with, and in close proximity to, the line conductor, there are certain conditions under which a portion of the element and the conductor may engage each other with sufficient force to permanently distort or injure the element.

Various means have also been suggested for preventing the above-mentioned permanent distortion but in any of such devices of which I am aware, the damage is prevented by having the arc control element constructed of relatively movable portions, such as removable sections, pivotally-mounted half-ring portions and the like.

It is my object to accomplish the above-mentioned purposes by the use of a single integral or rigid element or ring having no removable section and no relatively movable parts.

Accordingly, in practicing my invention, I provide a rigid field control element or ring that is disposed in a symmetrical or central normal operating position and centered therein, as by springs, to move in response to movement of the conductor in either of two directions. Accordingly, if the conductor is broken or otherwise affected, at one side or the other of the device, such movement results.

Figure 1, of the accompanying drawing, is a top plan view of a transmission-line device embodying my invention.

Fig. 2 is a side elevational view of the structure shown in Fig. 1.

Fig. 3 is a view of a portion of the device shown in the other figures, as viewed in the direction of an arrow III at the right side of Fig. 2, and

Fig. 4 is a detail view of portions of the device as shown in Fig. 2 but in different relative positions.

The device comprises, in general, a clamp 2 for the reception of a transmission-line conductor 3, a suspension insulator 4 for supporting the clamp 2 and an electrostatic-field-control device 5 of my invention.

The clamp 2 may be of any usual and well known type, but, as illustrated, is preferably of the type above-mentioned for permitting the conductor 3 to slip therethrough under certain abnormal conditions, such as the breakage of the conductor between its main supports or towers.

The clamp 2 may comprise a channel member 7, an upper clamping shoe 8, a leaf spring 9 and a yoke 10 that is pivotally con-

nected to the channel member 7 by trunnions 12.

The specific construction of the clamp 2 which is shown in copending application by N. A. Walhberg, Serial No. 209,441, filed July 30, 1927, now Patent No. 1,819,533, dated August 18, 1931, and assigned to the Westinghouse Electric & Manufacturing Company, is not particularly germane to this invention, as claimed, and need therefore not be described specifically herein beyond the fact that angular relative movement between the channel 7 and the yoke 10 releases the spring 9.

The particular feature of interest in connection with this invention is that, when such action occurs, and with the device 5 constructed as such rings are ordinarily constructed, the conductor 3 is likely to engage the field control device as heretofore used with sufficient violence to permanently distort the latter.

In the present instance, instead of the field-control device 5 being rigidly mounted, and instead of providing it with relatively movable sections, it is pivotally mounted, as a whole, on the yoke 10, so that it may move, relative to the other parts, in a clockwise or counter-clockwise direction, as viewed in Fig. 2.

More particularly, the device 5 is, in general, of substantially closed loop shape as viewed in Fig. 1 having end portions 16 of relatively extensive conducting surface area, side portions 17 of relatively small area, and supporting arm portions 18 of substantially U-shape as viewed in Fig. 1, and disposed below the side portions 17. The portions 16 are provided with substantially spheroidal portions 20 and yieldable shock reducing elements 22 at the under sides thereof.

The elements 22, which may be of various suitable forms, are preferably, however, constructed of resilient strap metal of substantially bow-shape having ends soldered, welded, riveted or otherwise suitably secured to the portions 16 and the intermediate portions bowed downwardly to a position on a path toward the conductor 3 in advance of the portions 16.

Brackets 23, secured to the supporting arms 18 as by screws 24, are provided with pivot bearing portions 25 for mounting on pivot pins 26 supported in the yoke 10.

Both or only one of the brackets 23, as illustrated, may be provided with a center projection 27 for positioning the inner ends of springs 28 that are disposed between the projection 27 and ends 29 of a bracket 30 that is secured to the yoke 10 as by screws 32.

In operation, when through breakage of the conductor, or other cause, movement of the conductor 3 causes sufficient relative angular movement between the members 2 and 10 about the pivot pins 12, the conductor rises at one side or the other of the center of the figure, as viewed in Fig. 2, to engage one or the other of the resilient shock-reducing members 22 which yield slightly to reduce the shock of impact, and to cause the structure 5 to move, as a whole, about the pivot pin 26, which movement is opposed by the springs 28.

When the line is restored to its normal operating condition and the force of the conductor impinging against the shock reducing member 22 is removed, the springs 28 cause the structure 5 to automatically resume its central position, as illustrated.

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. In a transmission-line device, the combination with an insulator and a line-conductor clamp including pivotally-connected suspension and conductor-clamping members of an electrostatic-field-control structure including a field-control portion pivotally mounted on said suspension member and extending in opposite directions from the insulator along the conductor, means for yieldably holding said field-control portion in position and means between the field-control portion and the conductor for reducing the force of impact between the conductor and said field-control portion.

2. In a transmission-line device, the combination with an insulator, of an electrostatic-field-control structure having a field-control portion disposed above the line conductor and yieldable shock-reducing means between the conductor and said portion.

3. In a transmission-line device, the combination with an insulator, of an electrostatic-field-control structure having a field-control portion of substantially loop-shape disposed about the insulator axis above the line conductor and yieldable shock-reducing means between the conductor and said portion.

4. The combination with an insulator for flexible suspension on a support, and a clamp including a conductor-receiving channel member and a yoke movably connected to the channel member and to the insulator, of an electrostatic-field-control structure including a portion of substantially closed-loop shape surrounding the longitudinal axis of the insulator above the conductor and pivotally mounted on said yoke, said structure having a rigid projecting arm, a bracket rigidly secured to the yoke and extending in opposite directions therefrom in the direction of said channel member, and a pair of springs oppositely co-acting between each end of said bracket and said arm for normally holding the loop portion in predetermined position

and permitting it to move as a whole in one direction or the other about its pivot in accordance with predetermined movement of the conductor at one side or the other of said pivot.

5. In combination, a suspension structure including a dielectric member and an element depending therefrom, a cable-receiving member pivotally mounted on said element, an electrostatic-field-controlling device including loop-supporting means pivotally mounted on said element and a loop surrounding the insulator axis above the cable-receiving member, and yieldable means cooperating between said element and said loop-supporting means normally balancing the loop at a position centrally of its path of movement substantially at right angles to said axis.

In testimony whereof, I have hereunto subscribed my name this 8th day of August, 1928.

FREDERIC H. MILLER.