

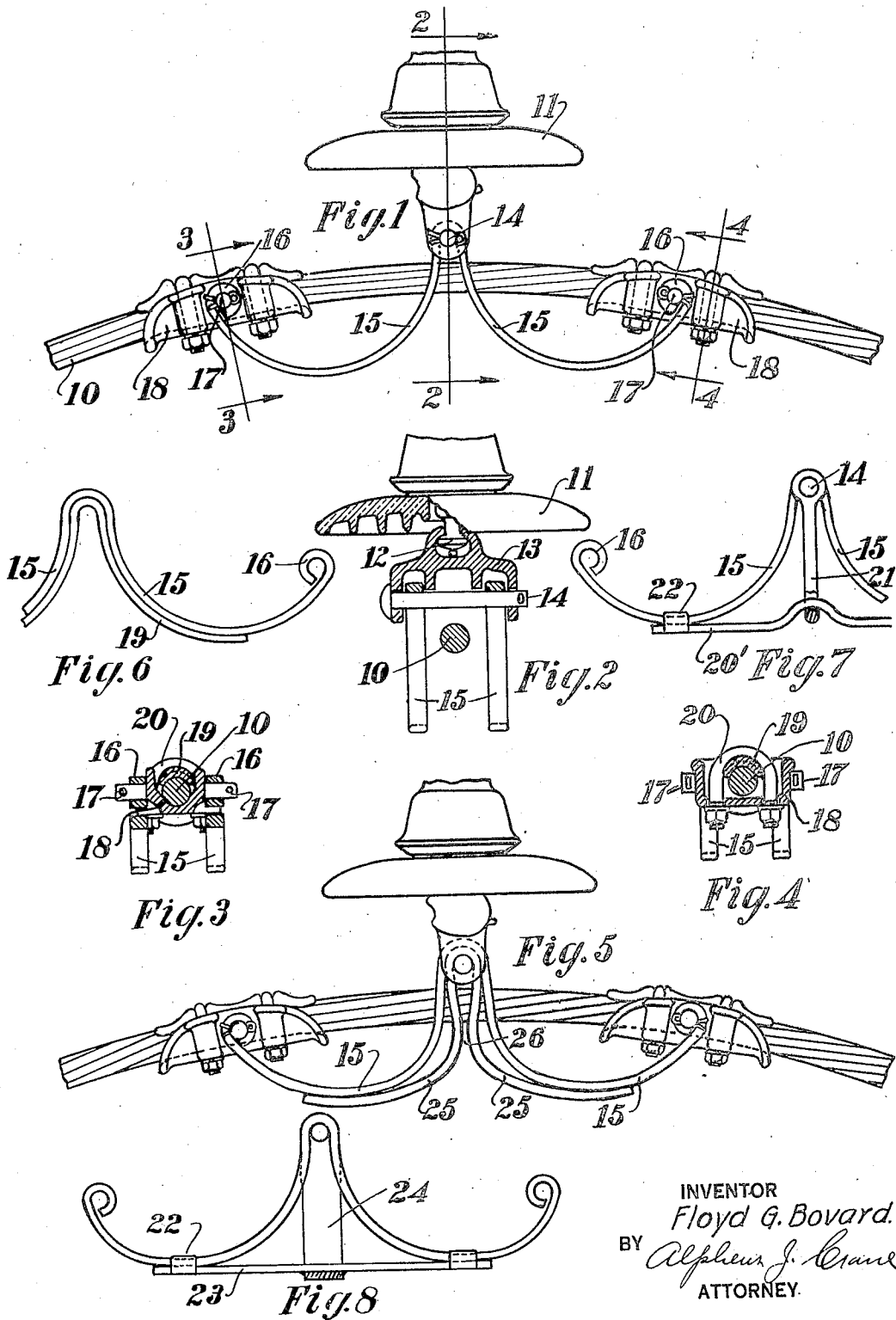
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SPRING SUPPORT FOR CONDUCTORS

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SPRING SUPPORT FOR CONDUCTORS

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11 Claims. (Cl. 248—63)

This invention relates to supports for electrical conductors and is particularly adapted for high voltage lines where heavy cables are employed.

One object of the invention is to provide maximum freedom of movement of the conductor where it is supported so as to minimize the tendency of the conductor to break due to bending at the point of support.

Another object of the invention is to provide a spring cushion between the conductor and the supporting insulator so as to reduce the transmission of vibrations from the conductor to the insulator.

A further object of the invention is to provide a support which will permit expansion and contraction of the conductor due to temperature changes without setting up dangerous stresses in the conductor or the support.

A further object of the invention is to provide a device of the class named 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 of a conductor support illustrating one embodiment of the present invention.

Fig. 2 is a transverse section on line 2—2 of Fig. 1.

Fig. 3 is a transverse section on line 3—3 of Fig. 1.

Fig. 4 is a transverse section on line 4—4 of Fig. 1.

Fig. 5 is an elevation showing a modified form of the invention.

Figs. 6, 7 and 8 are fragmentary elevations showing modified forms of the supporting spring.

In Fig. 1 of the drawing, the numeral 10 designates a conductor cable which may be of any of the approved forms supported by a string of insulators 11 of conventional construction.

Suspended from an insulator 11 by means of a ball and socket joint, shown at 12 in Fig. 2, is a fitting 13 which supports a pivot pin 14. A supporting spring bar is bent to provide oppositely extending arms 15, the bar being pivotally mounted at its middle on the pin 14. The bar comprising the arms 15 is continuous from end to end but is bent to form a bight at its middle portion which engages the pivot pin. Eyes 16 are

formed at the outer ends of the respective arms for supporting trunnions 17 of conductor clamps 18. Each of the clamps 18 is provided with a keeper 19 and U-bolts 20 for gripping the conductor 10, as shown in Figs. 3 and 4. The clamps thus supported are free to tilt upon their trunnions 17 so as to accommodate themselves to any angle that the cable may take relative to the horizontal. The clamps are also movable up and down against the stress of the spring arms 15 to cushion any vibration of the cable so as not to produce bending at the points of support. The resistance of the spring arms to vibration also tends to damp out the vibrations and the arms 15 are also movable about the axis of the pin 14 to facilitate movement of travelling waves past the point of support and to accommodate the supporting clamp to any tilted position of the cable. The clamps 18 are also movable longitudinally against the stress of the spring arms 15 to accommodate expansion or contraction of the cable between clamps. It will thus be seen that the support provides a maximum freedom of movement of the cable so as to avoid stresses set up in the cable by vibration or other causes and so as to prevent transmission of vibration to the supporting insulator string.

The spring arms 15 may be reinforced for heavy cable or where other conditions require. For this purpose a spring having a plurality of leaves, as shown in Fig. 6, may be employed, or a supporting bracket, as shown in Fig. 7, may be used. In Fig. 6 a single supplemental leaf is shown, but it will be readily apparent that any required number of supplemental leaves may be employed. In Fig. 7 a bar 20' is supported beneath the arms 15 of the spring by means of a suspension link 21. The arms 15 rest loosely upon the ends of the bar 20', the bar being provided with stops 22 to prevent relative lateral movement of the arms 15 relative to the bar 20'.

In the form of the invention shown in Fig. 8, a reinforcing bar 23 is provided similar to the bar 21 except that it is rigidly secured to a suspension bracket 24 instead of being loosely pivoted upon a supporting link, as shown in Fig. 7.

The modification shown in Fig. 5 is similar to that in Fig. 1 except that the spring arms 15 are each provided with a reinforcing leaf spring 25. The branches of the spring 25, instead of following the contour of the arms 15 as in Fig. 6, are bent inwardly so that they approach each other at the point 26. This arrangement will permit a limited range of relatively free movement but if the conductor is subjected to an

unusually heavy load, the arms 25 will contact at the point 26, thus providing a much stiffer supporting spring. This form of the invention is particularly advantageous in case of the accumulation of sleet on the conductor or of any other unusual loading on the conductor.

I claim:

1. The combination with a transmission line conductor, of clamps engaging said conductor at spaced points thereon, the weight of said conductor being supported by said clamps, a spring bar having its opposite ends connected with said clamps respectively, both ends of said bar being bent downwardly from its middle portion to form a bight at its middle portion, the ends of said bar being curved upwardly at opposite sides of said bight, and a horizontal pivot engaging said bight for supporting said bar.

2. The combination with a transmission line conductor, of a pair of clamps engaging said conductor at spaced points thereon, a pair of spring bars connecting said clamps and disposed at opposite sides of said conductor, and means for pivotally supporting said bars between said clamps, the portion of said conductor between said clamps being vertically movable relative to said spring bars in a vertical plane between said bars.

3. The combination with a transmission line conductor, of a pair of clamps engaging said conductor at spaced points thereon, a spring bar having its opposite ends pivotally connected to said clamps respectively and means for pivotally supporting said bar between its ends, said bar being curved between its point of support and each of said clamps about separate centers of curvature located above said bar to permit movement of said clamps in the direction of the axis of said conductor the portion of said conductor between said clamps being entirely supported by said clamps.

4. The combination with a transmission line conductor, of a pair of clamps engaging said conductor at spaced points thereon and supporting said conductor and spring means for supporting said clamps, said clamps being pivotally mounted on said spring means and yieldably connected together thereby and constituting the only supporting connection between said spring means and said conductor, said spring means having reverse bends therein and being yieldable longitudinally and transversely of said conductor.

5. The combination with a transmission line conductor, of a pair of clamps engaging said conductor at spaced points thereon, a support for said conductor between said clamps and spring arms pivotally mounted on said support and pivotally connected to said clamps for supporting said clamps, said clamps constituting the entire supporting connection between said conductor and said spring arms the inner ends of said arms being fixed to each other so that the weight on one arm is balanced against the weight on the other about the pivotal support for said arm, said arms extending downwardly from their point of support and being curved upwardly about separate points above said arms.

6. The combination with a transmission line conductor, of a spring support for said conductor, and means for providing supplemental reinforcement

for said spring support when said spring support yields a predetermined amount, said means comprising abutments which are brought into contact only when said spring arms have yielded a predetermined amount.

7. The combination with a transmission line conductor, of a pair of clamps connected to said conductor and supporting the weight of said conductor at spaced points thereon, spring arms for supporting said clamps, and means for providing supplemental reinforcement of said spring arms said means coming into action only when said spring arms yield a predetermined amount.

8. The combination with a transmission line conductor, of a pair of clamps engaging said conductor at spaced points thereon and supporting the weight of said conductor, a spring for supporting said clamps, means for pivotally supporting said spring between said clamps, and means for providing supplemental reinforcement for said spring when said spring yields a predetermined amount under the weight on said clamps, said supplemental reinforcing means being pivoted to move about the pivotal support for said spring and comprising abutments that engage each other to enhance the effect of said supplemental means only after said spring has yielded a predetermined amount.

9. In combination a support for a conductor, a lever arm pivotally mounted on said support to swing about a horizontal axis, and means at the respective ends of said lever arm for engaging said conductor at spaced points therealong, said lever arm being formed of spring material, the opposite ends of said arm being extended downwardly from said axis and then bent upwardly about separate centers of curvature at opposite sides of said axis and above said arm and yieldable longitudinally of said cable and transversely thereof in a vertical direction.

10. The combination with a support for a conductor, of a spring arm pivotally mounted between its ends on a horizontal axis on said support, and clamps pivotally mounted on horizontal axes on said arm at the respective ends thereof and supporting a conductor at spaced points along said conductor, said arm being centrally bent to form a bight for its pivotal mounting and each end portion of said arm being reversely curved between its point of pivotal mounting on said support and the respective ends thereof to permit spring movement of the ends of said arm in the direction of the length of said conductor.

11. The combination with an insulator, of a spring arm pivotally mounted on said insulator, clamps pivotally mounted on said arm at opposite sides of said insulator and counterpoised by said arm against each other, said arm being curved between its point of pivotal support and its pivotal connections with said clamps about separate points above said arm and at opposite sides of its pivoted mounting on said insulator to permit yielding movement of said clamps toward and away from the point of pivotal support of said arm on said insulator, and a conductor carried by said clamps, said clamps constituting the entire supporting connection between said conductor and said spring arm.

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