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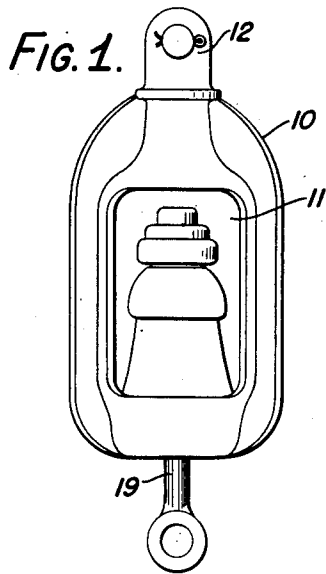


FIG. 2.

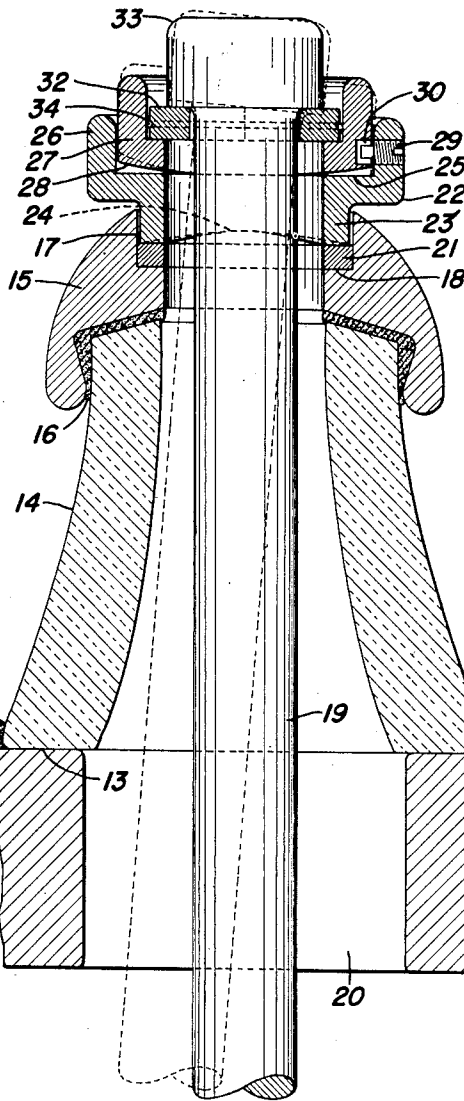
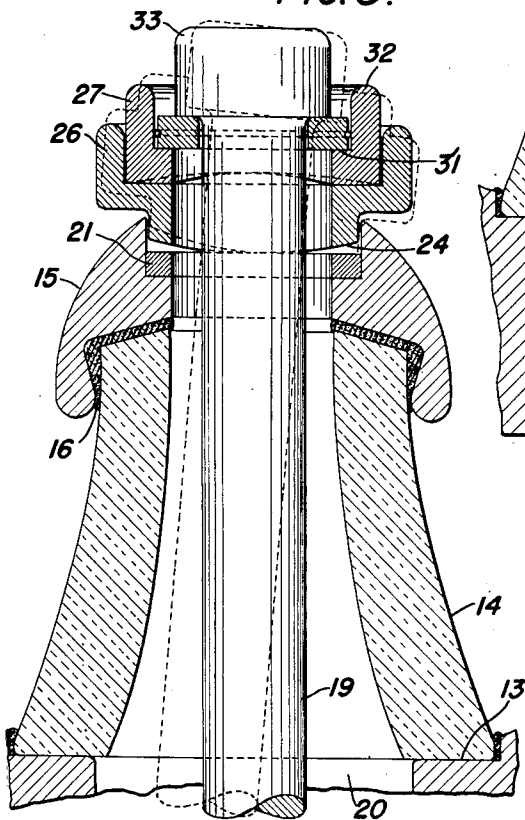


FIG. 3.



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GUY INSULATOR

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9 Claims. (Cl. 174—208)

1

The invention relates to strain insulators for guy wires and cables for supporting radio masts and the like, as disclosed, for example, in Figs. 1 and 4 of the patent to Ralph L. Jenner, No. 1,937,964, and in Fig. 2 of the patent to Lapp and Jenner, No. 1,998,549, comprising a body or yoke for attachment to a cable end and mounting a ceramic compression insulator member on which is supported a tension rod, eyebolt, or the like for connection to the adjacent end of the cable. The tension rod in such construction has commonly been supported by a flat shoulder resting on a cap on the insulator member or by some similar connection involving resistance to swinging movement of the bolt. Such wires or cables are subject to vibration by wind action and vibration by this or any other cause has tended to produce bending of the bolt, in addition to the tension to which it is subjected by the cable connections. Such bending has caused fracture and failure of the bolt and insulator and of the cable to which it is connected and even of the mast supported by the cable. One object of the invention, therefore, is to provide an improved strain insulator of the above character having a tension bolt which is connected for free swinging movement, without bending, to provide a more durable and efficient type of construction.

Another object is to provide a strain insulator having the above construction and in which the tension bolt is supported by parts having a relative rolling movement on one another in both of two mutually perpendicular directions, so as to allow the bolt to swing with a minimum of frictional resistance to vibrations in the cable to which it is attached, thus relieving the bolt of bending stresses.

A further object is to provide a strain insulator having the above advantages in a simple and practical type of construction capable of being readily manufactured and assembled and of operating durably and reliably for indefinite periods.

To these and other ends the invention resides in certain improvements and combinations of parts, all as will be hereinafter more fully described, the novel features being pointed out in the claims at the end of the specification.

In the drawings:

Fig. 1 is a side elevation of a strain insulator embodying the present invention;

Fig. 2 is an enlarged, central, sectional elevation of portions of the insulator shown in Fig. 1, and

Fig. 3 is a view similar to Fig. 2, but taken on a plane at right angles thereto.

2

The invention is embodied, in the present instance, in a strain insulator of the variety comprising a cast steel body 10 of generally yoke shape with a central opening 11 and a means or provision at its upper end, such as a clevis 12, for the attachment of an end of the cable. The yoke is formed at the bottom of opening 11 with a socket 13 in which an insulator member 14 is mounted and cemented, as shown. The insulator member 14 is preferably a truncated or frusto-conical hollow cone, of porcelain or other ceramic material, provided on its upper end with a metallic cap 15 which may be cemented on the top of the cone, as indicated at 16. This insulator member is preferably of the compression type disclosed in the said patent to Lapp and Jenner, No. 1,998,549. The top of the cap is preferably recessed, as at 17, to provide at the bottom of the recess an annular shoulder or bearing surface 18, for a purpose hereafter described.

The tension bolt for attaching the lower end of the insulator to the cable is shown in the present instance as an eyebolt 19 extending upwardly in spaced relation through an opening 20 in the bottom of the yoke, through the hollow insulator member and through the seat 18 of its cap, and means are provided for supporting the upper end of the bolt for substantially frictionless rolling movement on the cap 15 of the insulator member, in each of mutually perpendicular directions, to afford substantially frictionless swinging movement of the bolt on the insulator during vibration of the cable.

Such means comprises, preferably, a steel ring 21 seated on the shoulder formed by the bottom of the recess 17 in the cap, to afford a smooth flat bearing surface for rolling movement of a superposed ring-like part 22. Part 22 has a depending flange 23 adapted to rest on the ring 21 and the lower end of the flange is cylindrically curved on a radius of, say, 8 inches, to provide a curved surface 24 by means of which the ring is supported for substantially frictionless rolling movement in one direction on the bearing surface afforded by the ring 21. Ring 22 is formed with an upper flat, smooth bearing surface 25, surrounded by an upwardly extending flange 26, for cooperation with a curved bearing surface on a superposed inner ring-like part 27.

Ring part 27 has its upper end formed to provide a cylindrical curved bearing surface 28 adapted for substantially frictionless rolling movement on the bearing surface 25 of the outer ring, in a direction at right angles to the rolling movement of the outer ring 22 on its bearing surface on ring 21. This angular relation of the

curved surfaces of rings 22 and 27 is preferably maintained by an Allen set screw 29 extending through flange 26 of the outer ring into a recess 30 of the inner ring 27. Inner ring 27 is formed with an upper flat shoulder or bearing surface 31 adapted to support the parts of a split ring 32 fitted about the tension bolt 19 under its enlarged upper end or head 33. The head of the bolt may be freely inserted upwardly through the described openings in the yoke, insulator member and rings and the parts of the split ring 32 inserted about the bolt under its head and retained thereon by any suitable wire or other tie member 34 after which the bolt is seated by means of such split ring on the seat 31 of the inner ring-like part 27.

With the parts so assembled and connected in place in a guy cable, the tension of the cable holds them assembled as described. Any vibration of the cable and tension rod 19, as indicated in dotted lines in Figs. 2 and 3, is accommodated by rolling movement of inner ring 27 on outer ring 22, or by rolling movement of outer ring 22 on the bearing surface of ring 21 of the cap of the insulator member, or by both movements simultaneously. Since the curved bearing surfaces of the rings 22 and 27 afford rolling movements in each of two directions at right angles to each other, the tension rod is thereby supported for substantially frictionless, universal, rocking or swinging movement on the insulator member 14 in response to any vibration in the cable. Since this swinging movement of the bolt is substantially without frictional resistance, the bolt is relieved of substantially all bending stresses and thereby adapted for substantially indefinite and reliable service in insulating the tension wire or cable. The terms tension wire or cable are intended in a broad sense as inclusive of any flexible guy support.

It will thus be seen that the invention accomplishes its objects and while it has been herein disclosed by reference to the details of a preferred embodiment, it is to be understood that such disclosure is intended in an illustrative, rather than a limiting sense, as it is contemplated that various modifications in the construction and arrangement of the parts will readily occur to those skilled in the art, within the spirit of the invention and the scope of the appended claims.

We claim:

1. A strain insulator for guy cables and the like, said insulator comprising a member of insulating material and having oppositely extending cable supporting means coextensive with said member and each attached to the remote end of said member for stressing the same in compression, one of said supporting means comprising three bearing parts with one of said parts located intermediate and in engagement with the other two of said parts, said intermediate part and each of said other parts having a pair of cooperating bearing surfaces therebetween one of which surfaces in each pair is curved relative to its cooperating surface for rolling movement relative to and upon said cooperating surface with a minimum of frictional resistance in a direction at right angles to the relative rolling movement between the surfaces of the other of said pairs of cooperating surfaces.

2. A strain insulator for guy cables and the like, said insulator comprising a member of insulating material and having oppositely extending cable supporting means coextensive with said member and each attached to the remote end of said member for stressing the same in compression,

one of said supporting means comprising three bearing parts with one of said parts located intermediate and in engagement with the other two of said parts, said intermediate part and each of said other parts having a pair of cooperating bearing surfaces therebetween shaped to provide a line bearing and afford relative rocking movement in each pair with a minimum of frictional resistance in a direction at right angles to the relative rocking movement between the surfaces of the other of said pairs of cooperating surfaces.

3. A strain insulator for guy cables and the like, said insulator having cable supporting means comprising an insulator member provided with a bearing surface, a part having a bearing surface cooperating with the bearing surface of said member, one of said bearing surfaces being shaped to provide a line bearing on the other of said cooperating surfaces to afford relative rocking movement therebetween in one direction with a minimum of frictional resistance, said part having another bearing surface opposite the first mentioned surface thereof, and another cable supporting means extending through said part and provided with a bearing surface cooperating with said other bearing surface of said part, one of said cooperating bearing surfaces of said other cable supporting means and part being shaped to provide a line bearing on the other of said cooperating surfaces to afford relative rocking movement therebetween with a minimum of frictional resistance in a direction at right angles to the direction of said rolling movement between the surfaces of said part and member.

4. A strain insulator for guy cables and the like, said insulator having cable supporting means comprising an insulator member provided with a bearing surface, a part having a bearing surface cooperating with the bearing surface of said member, one of said bearing surfaces being curved relative to the other of said cooperating surfaces for relative rolling movement therebetween in one direction with a minimum of frictional resistance, said part having another bearing surface opposite the first mentioned surface thereof, and another cable supporting means extending through said part and provided with a bearing surface cooperating with said other bearing surface of said part, one of said cooperating bearing surfaces of said other cable supporting means and part being curved relative to the other of said cooperating surfaces for relative rolling movement therebetween with a minimum of frictional resistance in a direction at right angles to the direction of said rolling movement between the surfaces of said part and member.

5. A strain insulator for guy cables and the like, said insulator comprising a body provided at one end with attaching means, an insulator member having one end mounted on said body, a bolt at the other end of said member provided with attaching means, said bolt extending through said member adjacent the other end thereof, and a universal joint supporting said bolt on the other end of said member for universal rocking movement relative thereto to relieve said bolt of bending stresses due to cable vibration.

6. A strain insulator for guy cables and the like, said insulator comprising a substantially yoke-shaped body provided at one end with attaching means, a substantially conical insulator member having one end mounted on said body, a bolt at the other end of said body provided with attaching means, said bolt extending through said member adjacent the other end thereof, and a uni-

5

versal joint supporting said bolt on the other end of said member for universal rocking movement relative thereto to relieve said bolt of bending stresses due to cable vibrations.

7. A strain insulator for guy cables and the like, 5
said insulator comprising a body provided at one end with attaching means, an insulator member having one end mounted on said body, a bolt at the other end of said body provided with attaching means, said bolt extending through said mem- 10
ber adjacent the other end thereof, and means for supporting said bolt on the other end of said member comprising two pairs of cooperating sur- 15
faces with one of the surfaces of each pair curved for rolling movement relative to and on the other surface of the pair in a direction at right angles to the relative rolling movement between the sur-
faces of the other pair, to afford universal rocking movement of said bolt on said member with a minimum of frictional resistance for relieving 20
said bolt of bending stresses due to cable vibrations.

8. A strain insulator for guy cables and the like, said insulator comprising a substantially 25
yoke-shaped body provided at one end with attaching means, a substantially conical insulator member having one end mounted on said body provided with attaching means, a bolt at the other end of said body, said bolt extending through said member adjacent the other end 30
thereof, and means for supporting said bolt on the other end of said member comprising two pairs of cooperating surfaces with one of the surfaces of each pair curved for rolling movement relative to and on the other surface of the pair in a direction at right angles to the relative 35
rolling movement between the surfaces of the other pair, to afford universal rocking movement of said bolt on said member with a minimum of frictional resistance for relieving said 40
bolt of bending stresses due to cable vibrations.

9. A strain insulator for guy cables and the

6

like, said insulator comprising a substantially yoke-shaped body provided at one end with attaching means, a substantially conical insulator member having one end mounted on said body and provided adjacent its other end with a bearing surface, a bolt at the other end of said body provided with attaching means, said bolt extending through said member adjacent the other end thereof and being provided with a bearing surface and a ring-like part surrounding said bolt and provided with a bearing surface cooperating with the bearing surface of said bolt, one of said bearing surfaces being curved for relative rolling movement therebetween in one direction with a minimum of frictional resistance, and said part having another bearing surface cooperating with the bearing surface of said member, one of the bearing surfaces of said part and member being curved for relative rolling movement therebetween with a minimum of frictional resistance in a direction at right angles to the direction of rolling movement between said bolt and part.

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