July 29, 1947. G. G. GREENE ET AL 2,424,687

CONDUCTOR SUPPORT

Filed Feb. 16, 1946

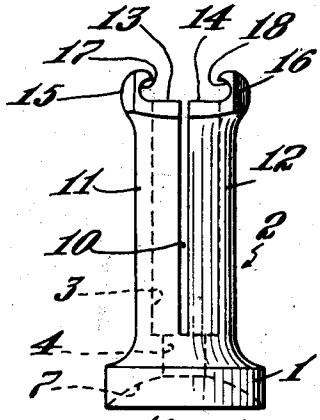

Fig. 1

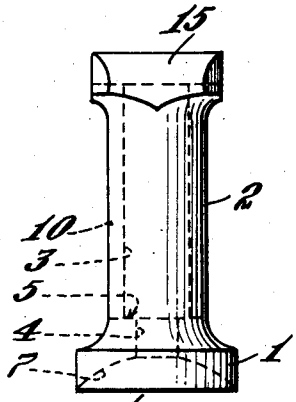

Fig. 2

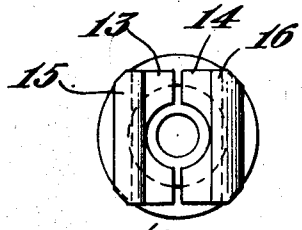

Fig. 3

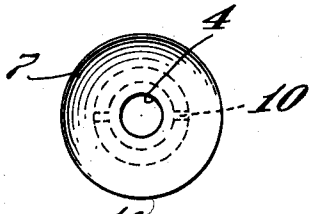

Fig. 4

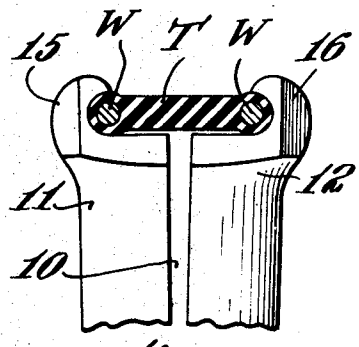

Fig. 8

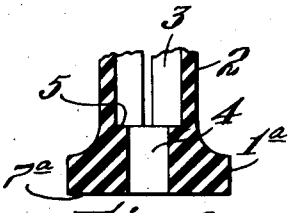

Fig. 9

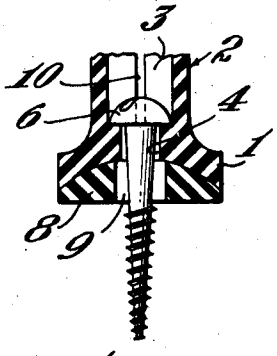

Fig. 6

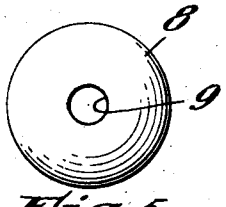

Fig. 5

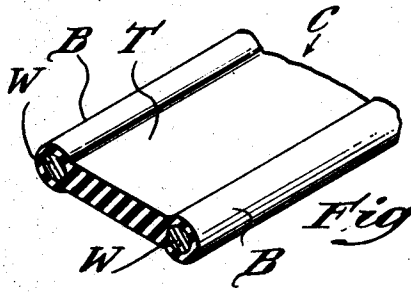

Fig. 7

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CONDUCTOR SUPPORT

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9 Claims. (Cl. 174—171)

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This invention pertains to insulators or insulating supports for electrical conductors, and more especially to a support for a flat, parallel-line conductor of ribbon-like form, such for example as is employed in television circuits. Such a ribbon-like conductor comprises a pair of conductor elements (wires, metallic strands, or the like) disposed in accurately parallel spaced relation and embedded in a flat or substantially flat tape-like body of flexible insulating material, for instance rubber, synthetic rubber, or plastic. The conductor elements are arranged at the marginal portions of the insulating body, and the latter may be thickened where the conductor elements are embedded, to form smoothly rounded bead-like edges. When herein a "ribbon-like" or "tape-like" conductor is referred to, it is intended thereby to designate such a conductor, comprising spaced parallel wires, as just above described.

For television, frequency-modulation, radio, or similar high frequency circuits, the antenna lead-in conductors are very sensitive to the presence of adjacent surfaces. Thus, for instance, if the lead-in conductor extend down along the side of a building wet by rain, inductive disturbances may be set up in the circuit unless both wires of the lead-in conductor are spaced equally distant from the building wall. To prevent an unbalanced condition in the line, the plane through the centers of the two wires comprising the line must be parallel to any conducting or semi-conducting surface when the line is within the near zone of said surface. An unbalanced condition enables the line to radiate excessively, thereby interfering with the proper operation of the antenna.

To prevent too great a change in the characteristic impedance of the parallel line, the line should be mounted as above with the exception that it is held far enough away from the surface so as not to cause too great a change in the characteristic impedance of the line.

The principal object of the present invention is to provide an insulator or insulating support for such a ribbon-like conductor, in particular to provide an insulator for an antenna lead-in conductor or the like, which holds the axes of the two constituent wires of the conductor in a predetermined plane parallel to the surface of the part upon which the insulator is mounted, and at a predetermined distance therefrom; to provide an insulating conductor support so designed as to grip the conductor by its edges without necessitating the puncture of the insulating material for the reception of fasteners or the like, or

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the distortion of the insulating tape or any relative movement of the conductor elements; to provide a support which does not require any metal near or close to the parallel conductors; to provide a support into which the conductor may be introduced without the use of tools, and from which it may be removed if desired without injury to the conductor, but which very firmly and reliably holds the conductor in place when it is once seated in the support; and to provide a support which in a preferred embodiment may be inclined, with reference to the member upon which it is mounted so that if such member be inclined, for example, like the surface of a weatherboard, relatively to the general plane of the structure (i. e. building wall) on which the conductor is mounted, the plane of the conducting wires may still be parallel to said wall. A further object is to provide a support of simple design, which is easy to manufacture and which is rigid, durable, and has good insulating characteristics. Other and further objects and advantages of the invention will be pointed out in the following more detailed description and by reference to the accompanying drawings wherein

Fig. 1 is a front elevation of the support;

Fig, 2 is a side elevation of the support;

Fig. 3 is a plan view of the support;

Fig. 4 is a bottom view of the support;

Fig. 5 is a plan view of a bearing washer for use with the support shown in Figs. 1 to 4 inclusive;

Fig. 6 is a fragmentary diametrical section showing the lower portion of the support, assembled with the bearing washer and with a screw for securing the support to a part upon which it is to be mounted;

Fig. 7 is a perspective view showing a short length of conductor of the type to which the present invention relates;

Fig. 8 is a fragmentary front elevation of the support of the present invention, showing its upper portion only and with a conductor (in section) mounted in the support; and

Fig. 9 is a fragmentary diametrical section showing the lower portion of a support of modified construction.

Referring to the drawings, the conductor support as here illustrated comprises a body portion consisting of a unitary mass of insulating material, for instance vulcanized rubber or a rubber compound, or a synthetic resin, for example one of the vinyl resins, polystyrene, or a phenol-formaldehyde, and may be made in any desired manner, for instance by moulding, in accord-

ance with customary practice in the moulding of synthetic resin or vulcanized rubber.

This body portion, as illustrated, comprises a base 1, here shown as of circular transverse section, from which rises the tubular columnar portion 2, the latter having the vertical axial bore 3, which at the lower part of the body portion is of reduced diameter, as shown at 4, thus providing a horizontal shoulder 5 for engagement by the head 6 of a fastener, for example a wood screw, which extends down through the lower part 4 of the bore and into the member upon which the support is mounted. In a preferred embodiment the lower surface 7 of the base 1 is upwardly concave and of spherical curvature and is designed to rest upon the spherically curved upper surface of a washer 8, which may be made of the same material as the body portion of the support, or of any other suitable material, for instance wood, glass or metal, and which has a central aperture 9 for the passage of the body of the attaching screw. By mounting the body of the support upon such a spherically curved washer it is possible to fix the support with its longitudinal axis perpendicular to the general plane of a building wall, for example, even though the surface of the washer contact the inclined face of a weatherboard.

The tubular portion 2 is diametrically slotted, as shown at 10, thus providing two upstanding posts 11 and 12, integrally joined at their lower ends to the base 1. Normally the walls of the slots 10 are substantially parallel, but since the material of the support, although normally rigid, is slightly resilient, the upper portions of the posts 11 and 12 may be sprung away from each other slightly in response to applied stress.

The upper ends of these posts 11 and 12 are substantially flat, as shown at 13 and 14, but have, upstanding from their outer portions, the horns 15 and 16 respectively, having notches or recesses defining the concave seat surfaces 17 and 18 at their inner or opposed sides.

The conventional conductor C (Fig. 7) which is to be mounted in the support, comprises the spaced parallel wires W embedded in the tape-like insulating body T of any appropriate insulating material. While the tape may be of uniform thickness from edge to edge, it may on the other hand, as here illustrated, be thickened at those portions at which the wires are embedded, so as to form marginal beads B somewhat thicker than the central portion of the tape, and providing smoothly rounded edges.

The support of the present invention is so designed and dimensioned that in the normal position of the horns 15 and 16, the distance between the concave seat surfaces 17 and 18 is slightly less than the distance between the outer surfaces of the beads B of the conductor. However, by springing the upper portions of the posts 11 and 12 apart, as may readily be done manually, or merely by pressing the conductor downwardly between the horns, it is possible to snap the conductor into the seat provided by the horns 15 and 16, so that the beads B of the conductor engage the curved surfaces 17 and 18, the resiliency of the material of the support being such that when once seated between the horns 15 and 16, the conductor is firmly gripped and securely held in place.

The centers of curvature of the curved surfaces 17 and 18 of the horns 15 and 16 are in a plane which is parallel to the plane of the lower edge of the base 1, and the radii of these surfaces are substantially equal to or but slightly greater than the radii of the edges of the conductor, so that

when the conductor is properly mounted in the support, the plane of the axes of the wires W is necessarily parallel to the plane of the lower edge of the base of the support. Thus when a series of the insulators is mounted upon the same supporting surface, it is assured that both conductor elements W will be maintained in a plane parallel to said surface.

While it is preferred to provide the base of the support with the upwardly concave under surface 7 designed to rest upon the washer 8, it is contemplated that the base 1^a of the support, as shown in Fig. 9, may have a flat under surface 7^a perpendicular to the axis of the axial bore 3 of the support.

While certain desirable embodiments of the invention have herein been illustrated by way of example, it is to be understood that the invention is broadly inclusive of any and all modifications falling within the scope of the appended claims.

We claim:

1. An insulating support for a ribbon-like electrical conductor, said support comprising a base of circular transverse section from which rises a tubular columnar portion having an axial bore and which is diametrically slotted to provide two posts united at their lower ends to the base, each post having a seat surface for engagement with one edge respectively of the conductor, the seat surfaces being normally spaced apart a distance slightly less than the width of the conductor, the material of the support being sufficiently resilient to permit the seat surfaces to be sprung apart to admit the conductor between them.

2. An insulating support for a tape-like electrical conductor, said support comprising a base having a bore for the reception of an attaching screw, a tubular column rising from and integral with the base, said column being diametrically split to define two posts, a horn at the upper end of each post, the inner surfaces of the horns defining seats for engagement by the opposite edges respectively of the conductor, the seats being normally spaced apart a distance slightly less than the width of the conductor and the material of the posts being sufficiently resilient to permit the seats to be sprung apart to admit the conductor between them.

3. An insulating support for a ribbon-like electrical conductor, said support comprising a base having an upwardly concave bottom surface, the base having an axial bore for the reception of a fastener element, a pair of posts rising from the base, a conductor-engaging seat element carried by each post, said seat elements being normally spaced apart a distance slightly less than the width of the conductor, the posts being sufficiently resilient to permit said seat surfaces to be sprung apart to admit the conductor between them, and a washer having a flat under surface and a convex upper surface, the latter engaging the concave bottom surface of the base.

4. An insulating support for a ribbon-like electrical conductor, said support consisting of a unitary mass of resilient insulating material, and comprising a base having a bore for the passage of the shank of a headed fastener, a concavity on the outside, and on the inside an abutment for engagement by the head of said fastener, a tubular column integral with the base, said column being diametrically slotted longitudinally to define a pair of upright posts, each post having a horn at its upper end, each horn having a concave

inner face, the centers of curvature of said concave faces being in a plane parallel to the plane of the lower edge of the base, the concave surfaces constituting seats for the opposite edges respectively of the conductor and being normally spaced apart a distance slightly less than the width of the conductor, but being separable by reason of the resiliency of the material of the support, to admit the conductor between said surfaces, and a washer having a flat under surface and a concave upper surface, the upper surface of the washer fitting within the concavity of the base.

5. An insulating support for an electrical conductor, said support having a base, extending therefrom a pair of spaced columns each having near its outer end a seat surface, said seat surfaces facing each other to receive the conductor between them, and the width of said seat surfaces axially of the columns being considerably less than the distance of the seat surfaces one from the other, the columns being of a resilient material whereby said seat surfaces may be sprung apart to admit the conductor between them.

6. An insulating support for a ribbon-like electrical conductor, said support consisting of a unitary mass of slightly resilient insulating material and comprising a base and a pair of posts rising therefrom, each post having at its outer end an inwardly concave seat portion facing the seat portion of the other post for engaging the edges respectively of the conductor, the base having an axial bore approximately normal to the plane defined by said seat portions, for the reception of an attaching element.

7. A support for a ribbon-like electrical conductor, said support including a pair of spaced seat elements having grooves facing each other for the reception of the opposite edges respectively of the conductor, a pair of elongated posts each carrying one of said seat elements at its upper end, and a base at which the posts are mounted, the width of said grooves being considerably less than their distance one from the other, the length of the posts permitting the seat elements to be sprung apart to receive the edges of the conductor in the grooves.

8. An insulating support for a ribbon-like electrical conductor, said support comprising a base having a face for contacting a mounting surface and a pair of posts integrally joined at their lower ends to the base, each post having a concave recess at the inner side of its upper end for the reception of an edge of the conductor, the centers of curvature of said concave recesses being in a plane parallel to the plane of said face.

9. An insulating support for a ribbon-like electrical conductor, said support comprising a base and a pair of spaced columns carried thereby, said columns having at the insides of their outer ends seat elements with recesses facing each other for the reception of the opposite edges respectively of the conductor, the conductor receiving crosswise width of said recesses being considerably less than their distance one from the other, the material of the columns being sufficiently resilient to permit the walls of the recesses to be spread apart to admit the conductor between them.

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