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2,530,812

SUPPORTING DETAIL FOR FLEXIBLE CONDUCTORS

Filed July 10, 1947

FIG. 1

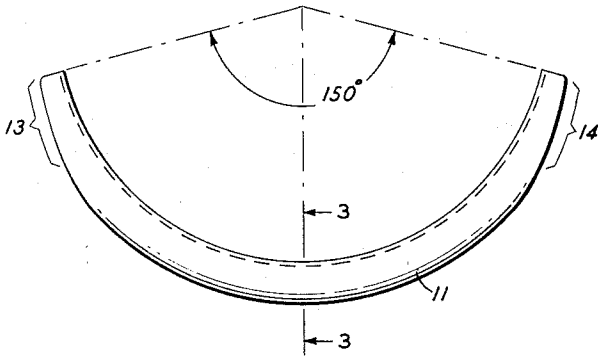


FIG. 2



FIG. 3

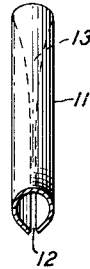


FIG. 4

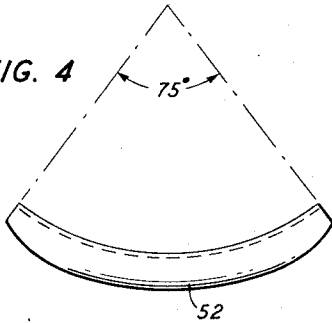


FIG. 5

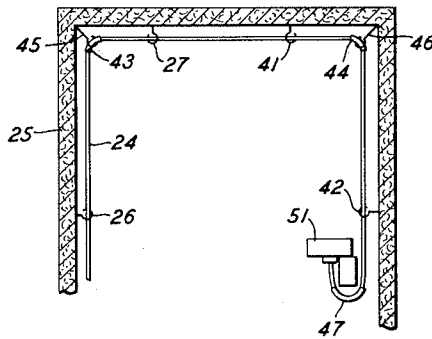


FIG. 6

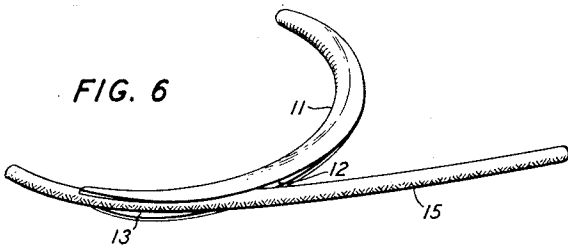
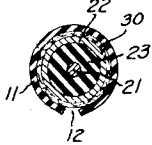


FIG. 7



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SUPPORTING DETAIL FOR FLEXIBLE
CONDUCTORS

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1 Claim. (Cl. 174—135)

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This invention relates to a supporting detail and more particularly to a detail or guide for supporting a flexible conductor.

It has been found in connection with the use of certain types of flexible insulated conductors that, if the conductor be subjected to sharp bending during installation and use, difficulties will frequently be encountered due to "cold-flow" of the insulation.

It is an object of the present invention to prevent difficulties in the use of flexible insulated conductors resulting from "cold-flow" of the insulation.

A more specific object of the invention is to prevent the abrupt bending of a flexible insulated conductor.

A further specific object of the invention is to restrict the curvature of a flexible insulated conductor during installation and use thereof whereby to prevent abrupt bends in the conductor.

In the normal installation and use of flexible insulated conductors, the conductor must of course be bent at various points, for example when a beam or other obstruction is to be passed, when a terminal device is to be entered or when, for various other reasons, the direction of the conductor is to be changed. For purposes of economy as well as of appearance the conductor is usually bent sharply at such points, frequently at right angles. In the instance of certain types of flexible insulated conductors it has been found that, when the conductor is so bent as to exceed a predetermined minimum radius of curvature and is maintained in such position, difficulties will be encountered due to gradual displacement, i. e., "cold-flow," of the insulating material. The supporting detail or guide contemplated by the present invention is effective to prevent sharp bending of the conductor without detracting from the appearance of the installation and without adding any involved or expensive procedures or apparatus.

A feature of the supportign detail contemplated by the present invention is that it may be applied to the conductor quickly and easily without the use of an installation tool of any sort.

A further feature is that the detail may be applied to a conductor at any point along its length, i. e., the conductor need not be threaded through the detail.

Still another feature is that the detail is self-supporting, i. e., it is effective in controlling the curvature of the conductor without the aid of additional supporting or fastening means.

According to a specific embodiment of the in-

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vention, the supporting detail or guide may be in the form of a fiber tube precurved in accordance with the minimum radius of curvature considered permissible for the particular conductor with which it is intended to be used. The tube is split longitudinally along the entire length of its periphery the slit being widened or flared for a short distance at each end. The formed tube is extremely resistant to forces acting in a direction tending to change its arcuate radius but offers only a yielding resistance to forces applied in a direction tending to widen the slit. When being applied to a conductor, the conductor is forced sideways in through the slit, the flared end portions facilitating initial entry of the conductor. While the installer may if desired use some simple tool, such as a screwdriver, to pry the edges of the slit apart, the construction is such that installation can readily be accomplished without the use of any tools whatsoever. After positioning on the conductor, the tube resumes its normal closed position wherein it fits snugly around the conductor with the edges of the slit separated by only a short distance of the order of between $\frac{1}{16}$ inch and $\frac{1}{8}$ inch. The conductor assumes the curvature of the tube the arcuate radius of which is sufficiently large to assure avoidance of trouble due to cold-flow of the insulation.

The details are snapped onto the conductor at points where the direction of the conductor is to be changed and will not prevent or hinder tying or otherwise fastening the cable to the wall, rack or other support in the usual manner. By the assurance of uniform bends in the conductor the installation is enhanced from an appearance standpoint and it is obvious that no expensive procedures or materials are added to the installation by use of the supporting detail contemplated, nor is the bulk of the cable appreciably increased. The construction of the detail is such that any possible injury to the covering of the conductor through its installation or use is prevented.

A complete understanding of the construction and use of the arrangement contemplated by the present invention as well as appreciation of the various desirable features thereof may be gained from consideration of the following detailed description and the attached drawings in which:

Fig. 1 is a side elevation view of a supporting detail or guide embodying features of the present invention;

Fig. 2 is an end view of the supporting guide of Fig. 1;

Fig. 3 is a sectional view taken through the device of Fig. 1 on line 3—3;

Fig. 4 is a side elevation view of another embodiment of the invention;

Fig. 5 is a view in partial section showing the use of a number of the guides in an installation;

Fig. 6 is a view showing the application of one of the supporting details to a flexible conductor; and

Fig. 7 is a sectional view of a supporting guide positioned upon a flexible conductor.

Referring now to the drawings and first to Figs. 1, 2 and 3 in particular, the supporting detail or guide 11 comprises a precurved tube provided with a slit 12 along the entire peripheral length thereof. The slit is provided at each end with widened, or flared, portions 13 and 14 respectively. As illustrated, the edges of slit 12 along the major length thereof, i. e., exclusive of the two flared end portions, are normally separated by only a short distance, for example, between $\frac{1}{8}$ inch and $\frac{1}{4}$ inch.

Tube 11, which may be constructed of vulcanized fiber, is precurved in accordance with the predetermined minimum radius of curvature considered permissible for the flexible conductor with which it is intended to be used, that is, the curvature of the tube is such as to prevent bending of the conductor so abruptly that undesirable cold-flow of the insulation would be likely to follow. Tube or guide 11, is so constructed that it offers extremely high resistance to any forces applied in a direction tending to alter its arcuate radius or, in other words, tending to change its major curvature. On the other hand, only a readily yieldable resistance is offered to forces applied in a direction tending to widen slit 12 sufficiently to admit the flexible conductor to which it is to be applied. It will be apparent therefore, that the supporting details or guides can be readily applied to the conductors but that, when in position thereon, they are effective to control the bending thereof at all points of application.

Referring for the moment to Fig. 6 the manner in which supporting detail or guide 11 is applied to conductor 15 is illustrated. Application of the guide or detail is started by positioning conductor 15 in one flared end portion 13 of slit 12, the flare being sufficient to permit ready entry of the conductor. Tube 11 is now "rolled" to the right along the conductor the walls of which act as a wedge to widen the edges of slit 12 to permit the entry of conductor 15 sideways through the slit into the detail. If desired, the installer may utilize a screwdriver or similar tool to widen slit 12 but it will be apparent that the construction of the detail or guide is such that attachment can readily be accomplished without the use of any tool whatsoever. After the detail has been completely mounted on the conductor it resumes its normal position wherein it encompasses the conductor snugly with the edges of slit 12 separated by only a short distance of the order of from $\frac{1}{8}$ inch to $\frac{1}{4}$ inch. This relationship is best illustrated by Fig. 7 wherein a coaxial conductor comprising a central conductor 21 and an outer conductor 22 separated by an insulating body 23 and a conventional covering or sheath 30 is shown positioned within supporting detail 11. As shown the edges of slit 12 are separated by only a small distance. This view is assumed to be taken at a point removed from the flared end portions of the guide as the edges are, of course,

more widely separated at the latter portions. After attachment of the guide or detail the conductor assumes the curvature of the detail at the point of attachment.

It will be obvious that the construction of the guide is such that no damage to the insulating sheath or other portions of the conductor can occur during the installation or use thereof.

Application of the detail can, of course, be started by positioning conductor 15 in flared end portion 14 of slit 12 instead of in portion 13 as described above; in such event the detail would then be "rolled" along the conductor to the left instead of to the right as described above.

It will be apparent from the above that the guides or details can be attached to the conductor at any point along the length thereof, i. e., the end or ends of the conductor need not be free to permit "threading" into the guide. It will be obvious further, that the detail is effective to hold the conductor and control the curvature thereof regardless of whether the cable is under tension or not.

A further embodiment of the invention is illustrated in Fig. 4. This embodiment comprises a precurved tube 52, which is provided with a peripheral slit both ends of which are flared, and which is, in short, generally similar to detail 11 except that it has a shorter arc for use on cable bends that have a shorter arc length.

Use of the supporting details in an actual installation is illustrated in Fig. 5. It is assumed that flexible conductor 24 is supported along the wall 25 of a building, for example a telephone exchange. Conductor 24 is supported from the wall by suitable means for example by the supporting hooks 26, 27, 41 and 42 illustrated. At points where the direction of the conductor is to be changed, such as at the two corners illustrated, supporting details or guides 43 and 44, of the type described above (particularly the embodiment of Fig. 4), are applied to conductor 24 in order to control the bending thereof for the purpose and in the general manner described above. Respective hooks 45 and 46 are provided for attaching the supporting details to wall 25 whereby to combine the functions of controlling the bending of the conductor and the attachment of the same to wall 25.

An additional supporting detail 47 (in this instance the embodiment of Fig. 1) may be applied to conductor 24 to control the curvature at the point where it is bent to enter terminal box 51. No supporting hook is provided at this point; it will be apparent that the supporting detail is complete in itself, that is, the function of curvature control is exercised by the detail itself without the additional provision of hooks or other supporting means. At the three points of attachment of the details or guides to conductor 24, the conductor assumes the curvature thereof thereby making certain that the required changes in direction of the conductor are accomplished by comparatively gradual curvatures rather than by abrupt bending which might result in damage to the conductor.

It will be apparent that the length, arcuate radius, extent of flared portions, width of slit and like characteristics of the supporting details or guides may be varied in accordance with the controlling characteristics of the particular conductor with which the respective supporting detail is to be used.

While specific embodiments of the invention have been selected for detailed description, it

will be apparent that the invention is not limited in its application to such embodiments. The embodiments described should be taken as illustrative of the invention and not as restrictive thereof.

What is claimed is:

A support for flexible conductors comprising, a preformed arcuate shaped tubular member of relatively stiff insulating material, said member having intermediate its ends a portion having a substantially circular cross section, said member provided with a longitudinally extending slit on its periphery which extends the full length thereof with its edges in abutting relationship at said intermediate portion but diverging from each other adjacent its ends to provide substantially semicircular cross section portions at the extremities of said tubular member, and the inside diameter of said tubular member, at its intermediate portion, being substantially less than the outside diameter of the conductor it is intended to embrace, said tubular member being resilient to forces applied in a direction tending to widen the

slit whereby the diverging end portions facilitate entry of the conductor.

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