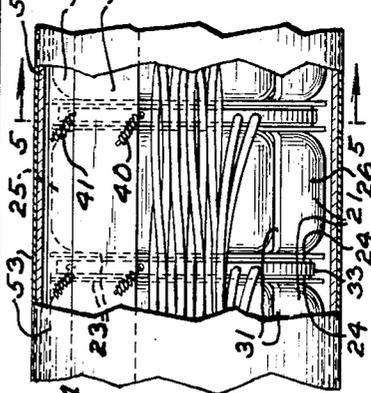
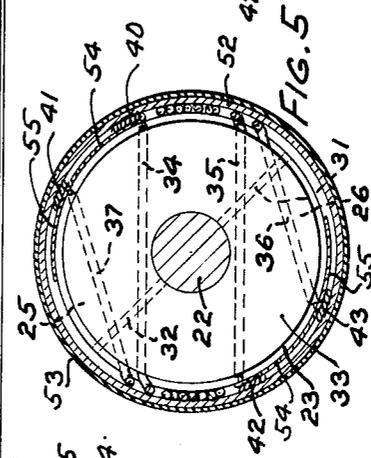
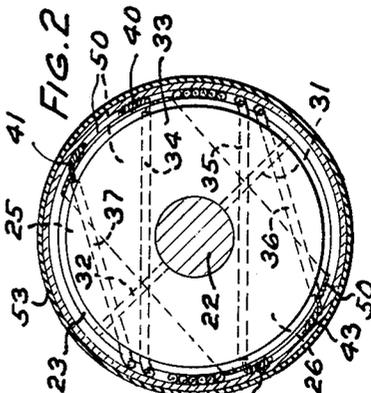
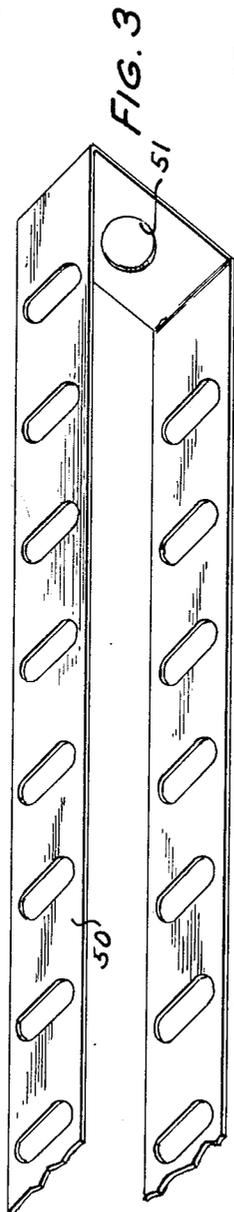
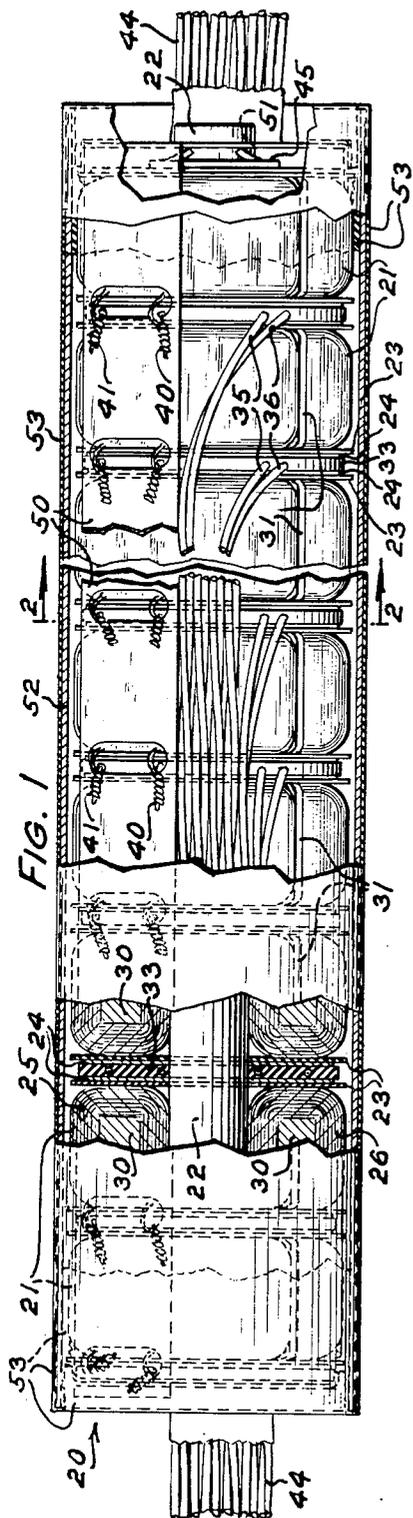


April 10, 1951

W. M. DROBISH ET AL  
ELECTRICAL COIL ASSEMBLY

2,548,205

Filed Oct. 10, 1947



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# UNITED STATES PATENT OFFICE

2,548,205

## ELECTRICAL COIL ASSEMBLY

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Application October 10, 1947, Serial No. 779,106

10 Claims. (Cl. 178-46)

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This invention relates to electrical coils and more particularly to loading coils for communication transmission lines.

An object of this invention is to provide a new and efficient loading unit for communication transmission lines.

In accordance with one embodiment of this invention a loading coil assembly is provided which comprises one or more toroidal loading coils mounted on a dowel and spaced from each other by insulating and shielding washers. Each of the coils has associated therewith a terminal supporting washer having stub terminals radiating therefrom to which are connected the ends of the coil windings. A terminal supporting washer of this type is described more fully and claimed in the copending application of E. L. Drom, Serial No. 717,527, filed December 20, 1946. To prevent short circuits between the terminals and the coils, a perforated insulating strip of paper or fiber is laid lengthwise across the assemblage with the terminal stubs extending through the perforations. The assemblage is then encased by a cardboard tube, and the entire assemblage is impregnated with an insulating varnish.

A complete understanding of the invention will be had by reference to the following detailed description taken in conjunction with the accompanying drawing, in which

Fig. 1 is a view partly in elevation and partly in section, of one embodiment of the invention, illustrating the use of the perforated insulating strip, and showing portions of the right end of the assembled unit stripped of insulating compound for better illustration;

Fig. 2 is a cross-sectional view of the assembly shown in Fig. 1 taken on the line 2-2 of that figure;

Fig. 3 is an illustration of one way of preforming the perforated strip before it is applied to the loading coil;

Fig. 4 is a broken-away view partly in section illustrating the use of an imperforate tape instead of the perforated strip shown in Figs. 1, 2 and 3; and

Fig. 5 is a cross-sectional view of the embodiment shown in Fig. 4 taken on the lines 5-5 of that figure.

As will be seen in the drawings a loading coil assembly 20 may comprise a plurality of similar toroidal coils 21 mounted on a dowel 22 and spaced from each other by insulating washers 23 and by iron washers 24 which serve to eliminate cross talk between the coils. Each of the coils 21 is ordinarily provided with two windings 25 and

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26 for loading a pair of telephone lines, the windings being disposed around a toroidal core 30 and separated from each other by spacers 31 and 32. The insulating washers 23 are fitted on each side of the coil 21, and adjacent to each insulating washer is an iron washer 24 which provides shielding to prevent cross talk between the coils. Associated with each coil 21 is a terminal supporting washer 33 having insulated wires 34, 35, 36 and 37 imbedded therein and extending therefrom. One end of each of said wires is cut short to form terminal stubs 40, 41, 42 and 43 to which the ends of the windings 25 and 26 are connected while the other ends 44 of the wires are relatively long so that they may be connected to the individual wires in a transmission cable. The terminal supporting washer 33 is of the type described and claimed in the copending application of E. L. Drom Serial No. 717,527, filed December 20, 1946.

Any desired number of such coils may be mounted on the dowel 22 after which the windings on the coils are connected to their respective stub terminals on the terminal washers. The coils are held firmly on the dowel by fasteners at each end, for example, spring fastening washers 45 forced over the dowel ends and against the iron washer adjacent to the end coils.

After the coils have been assembled on the dowel rod 22 a perforated insulating strip 50 made of paper or any suitable insulating material, which may be bent into a U-shape and provided with an aperture 51 to fit the dowel end, is placed over the coils so that the perforated legs of the U engage the peripheral surfaces of the coils on opposite sides with the terminal stubs 40, 41, 42 and 43 extending through the perforations and bent over to prevent possible short circuits from occurring between the terminal stubs and the coil windings during handling thereof. The long ends 44 of the wires leading from the terminal washers 33 are brought out along the length of the loading coil assembly at both ends. All the coil winding ends that are to be connected into one section of a cable should be connected to conductors whose long ends 44 are brought out at one end of the loading coil assembly and the other ends of the windings should be connected to the conductors whose long ends 44 are at the other end of the assembly. The assembly 20 is fitted into an insulating tube 52, for example, a cardboard or paper board tube of the type used as a "mailing tube," which should be long enough to extend slightly beyond the end coils. The conductors 44 may extend freely from both ends of

the tube. The tube covered unit after being thus assembled may be impregnated and coated by any suitable method with any suitable insulating compound 53, for example, a solvent-type varnish, to protect it from adverse atmospheric conditions and moisture, such for instance, as the compound and method of impregnation described in the copending application of E. J. Crane-R. P. Cross, Serial No. 717,526, filed December 20, 1946. It is preferable that the manner of impregnation and the material used will permit the insulating compound to penetrate into interstices between the coils and the tube.

In another embodiment of the invention, instead of using the perforated strip 50 to prevent the occurrence of short circuits between the terminals and the coils, strips of tape 54 and 55 may be laid across and adhesively attached to the peripheral surfaces of the coil, the strips extending lengthwise of the dowel 22 and lying adjacent to the terminal stubs 40, 41, 42 and 43 which may be bent flat across the top surface of the attached tape (Figs. 4 and 5). As in the other embodiment the entire assemblage may be encased in an insulating tube 52 after which the tube-covered unit may be impregnated and coated with a suitable insulating compound 53, as heretofore described.

What is claimed is:

1. A loading coil unit comprising a preformed absorptive cardboard insulating tube, a plurality of loading coils disposed in consecutive order within said tube, conductors connected to said loading coils, the free ends of said conductors extending out of the ends of said tube, and a coating of insulating compound on the tube-covered assemblage with portions of said compound extending into free spaces between said coils and said tube by virtue of the absorptive quality of said tube.

2. A loading coil comprising a coil element, a terminal supporting member adjacent to said coil element having terminals connected to said coil element, a strip of tape lying across said coil element and adjacent to said terminals, said terminals being bent over to engage the outer surface of said tape to prevent short circuits from occurring between said coil element and said terminals, a preformed tube made of insulating material and of substantially the same inside diameter as the outside diameter of said coil element disposed around said coil element and terminal supporting member, and a coating of insulating compound surrounding the tube-encased assembly.

3. A loading coil unit comprising a plurality of loading coils having short extending terminals, said coils being grouped together in a single row, a strip of tape lying across said coils and adjacent to said terminals, the terminals being bent over the top surface of the tape to prevent short circuits between the coils and the terminals, a tube made of absorptive insulating material disposed around the aforesaid assemblage, the said conductors extending out of the ends of the tube, and a coating of insulating compound around said tube-covered assemblage, portions of the compound extending into interstices between the coils and the tube by virtue of the absorptive quality of said tube.

4. A loading coil assembly comprising a rod, a plurality of toroidal coils mounted on said rod, a terminal supporting washer associated with each coil having terminals connected to said coils and having leads extending therefrom, a strip of

tape lying across said coils and adjacent to said terminals and said terminals being bent over the tape to prevent short circuits from occurring between the coils and the terminals, a preformed tube made of insulating material and of substantially the same inside diameter as the outside diameter of said coils and washers surrounding said assemblage of coils and washers, and a coating of insulating compound around the tube-covered assemblage.

5. A loading coil assembly comprising a plurality of toroidal coils having central annular openings, a supporting rod extending through said openings, a terminal supporting washer associated with each of said coils, said washers being mounted on said rod, terminals carried by said washers and connected to said coils, a strip of tape lying across said coils and adjacent to said terminals and said terminals being bent over the tape to prevent short circuits from occurring between the coils and the terminals, an absorptive insulating tube surrounding said assembly, and a coating of insulating compound on said tube-covered assembly.

6. A loading coil assembly comprising a supporting member, a plurality of toroidal coils mounted on said supporting member, a terminal supporting washer associated with each coil having terminals connected to said coils and leads extending therefrom, a strip of tape on said coils and under said terminals to prevent possible short circuits between said terminals and said coils, an insulating tube of substantially the same inside diameter as the outside diameter of the coils and the washers disposed around said assemblage of coils and washers, and a coating of insulating compound around said tube-covered assemblage.

7. A loading coil assembly comprising a supporting rod, a plurality of coil elements mounted on said supporting rod, supporting members associated with said coil elements and having terminals connected to said coil element, a strip of tape laid longitudinally of the rod across said coils and underneath said terminals to prevent short circuits between said terminals and said coils, a tube made of insulating material disposed around said assemblage of coils and terminal members, and a coating around said tube-covered assemblage.

8. In a loading coil unit as claimed in claim 1, terminal supporting washers associated with each of said loading coils, said washers having said conductors extending therefrom and also having terminals connected to said loading coils thereby to effect connection of said conductors to said loading coils, and a perforated insulating strip disposed on said coils with said terminals extending through the perforations in said strip.

9. In a loading coil unit as claimed in claim 1, a rod for supporting said loading coils, individual terminal supporting members associated with said coils having terminals connected to said coils and having said conductors extending therefrom thereby connecting said conductors to said loading coils, and a perforated insulating strip laid across said coils with said terminals extending through the perforations.

10. In a loading coil unit as claimed in claim 1, wherein said loading coils are toroidal in form and have central annular openings, a supporting rod extending through said openings, terminal supporting washers associated with each of said coils, said washers being mounted on said rod,

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terminals carried by said washers and connected to said coils, said conductors also being carried by said washers whereby said terminals effect connection of said conductors to said loading coils, and a perforated insulating sheet laid across said coils with said terminals extending through the perforations.

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