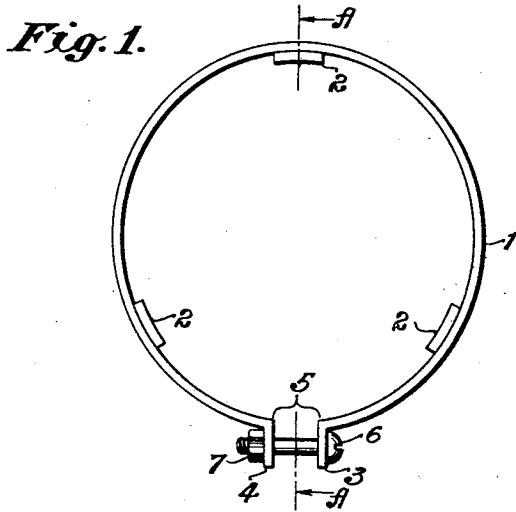
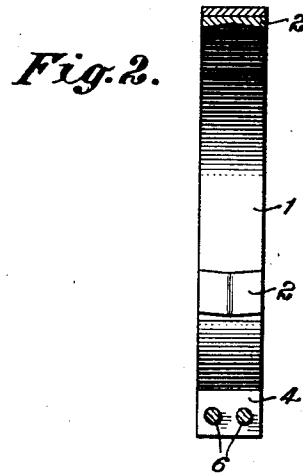
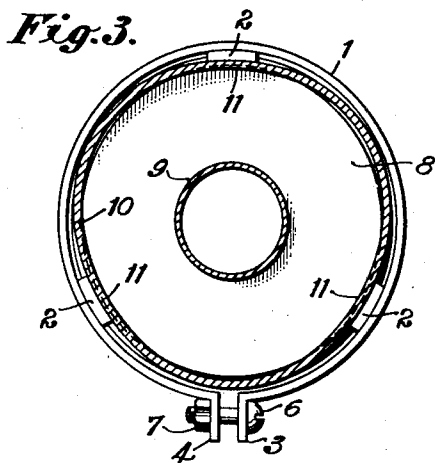
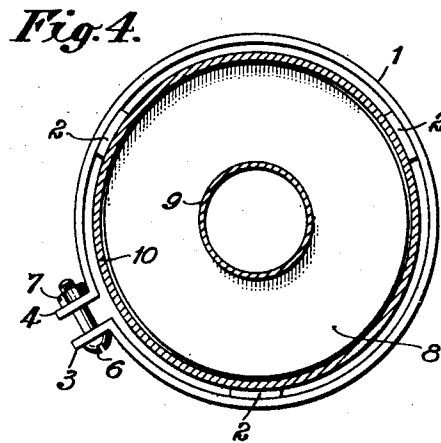
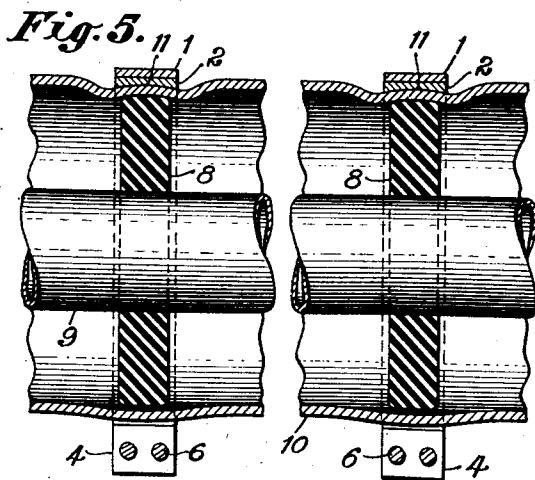


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C. W. HANSELL
 DEVICE FOR FASTENING INSULATING SPACERS
 IN CONCENTRIC TRANSMISSION LINES
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DEVICE FOR FASTENING INSULATING SPACERS IN CONCENTRIC TRANSMISSION LINES

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Original application May 15, 1941, Serial No. 393,682. Divided and this application August 14, 1941, Serial No. 406,804

4 Claims. (Cl. 174—28)

This invention relates to a new and improved device for fastening insulating spacers which are located within a metallic tube forming concentric transmission lines.

An object of this invention is to provide a device for slightly deforming a tube at a plurality of radially spaced points from a single point on the outside of the tube or shielding conductor.

Another object of this invention is to simultaneously deform the tube from a single point by means of an ordinary screw driver.

This application is a divisional application of my copending application, Serial No. 393,682, filed May 15, 1941, which has now matured into U. S. Patent 2,333,005, dated October 26, 1943, which patent contains claims directed to the method of producing a coaxial conductor, whereas the claims in this new application are specifically directed to the apparatus.

In the prior art, various methods and means for holding insulating discs which are used as spacers between the inner and outer conductors of a concentric line has been suggested. There has been a long felt need of retaining the insulating disc within the outer conductor by means of a simple method which will require a minimum amount of work and without the use of special tools or equipment. Also, several prior art methods frequently gave rise to a corona discharge from the inner conductor, due to the retaining means presenting a rough surface. A device employing a ring to deform the conductor and clamp the insulators is disclosed in the Young patent application, Serial No. 392,726, filed May 9, 1941. It is one of the objects of this invention to provide a device for holding the insulating disc in predetermined positions without marring the outside surface of the inner conductor, thus reducing the probability of corona discharge, also, this invention provides an outside surface of the inner conductor which is free from metallic clamping members, which has previously been used in some of the prior art construction. This will best be understood by referring to the accompanying drawing, in which:

Fig. 1 is an end view of a clamp type of deforming member of this invention;

Fig. 2 is a section of Fig. 1, the section being taken on line A—A thereof;

Fig. 3 is a section showing the clamp of this invention applied to the outer conductor of a concentric line;

Fig. 4 is another section of the clamp of this invention in which the gripping members have

been shifted approximately 60° with respect to Fig. 3; and

Fig. 5 is a longitudinal section, showing insulating spacers disposed within an outer conductor of a concentric line.

Referring now in detail to the drawing, a metallic band clamp 1, which in a practical case may be approximately 1" wide x 1/8" thick, is provided with three wedge-like clamping members 2, which are placed on the inner side of the band and as shown are preferably placed 120° apart. The wedge-like clamping members are made thicker at the ends than at the center and may be secured to the band 1 and disposed with their lengths transverse or cross-wise to the band, by any suitable means, such as by soldering, welding, etc. The lower portion of band 1 is provided with extension ears 3 and 4 which are so bent that a space 5 is provided. The ears 3 and 4 have apertures located therein for clamping screws 6 and nuts 7.

Referring now to Figs. 3 and 4, the operation of the clamping device of this invention is as follows: The insulating discs 8 are spaced at predetermined points along the outer surface of the inner conductor 9 over which is placed an outer conductor 10. The completely assembled clamping device of this invention is next placed over the outer conductor in a position so that the three wedge-like pieces 2 have their centers substantially over the centers of the spacers 8. The ends 3 and 4 of band 1 are tightly drawn together by means of bolts 6 and as is shown by Figs. 3 and 5, the wedges 2 will then deform the outer conductor slightly as shown at a point 11 in three places approximately spaced 120° apart, so that the insulating disc 8 will be held securely in place by operative engagement. Disc 8 is made only slightly smaller than the inside diameter of tube 10. The disc 8 is the ordinary form of insulating spacer having an aperture of the proper size for the inner conductor 9. It is composed of material having low dielectric loss at the ultra high frequencies. The inner diameter is made slightly larger than the outside of the inner conductor. The outside diameter is made but slightly smaller than the inside diameter of the outer conductor 10, and for ease in assembly, the edges are rounded over slightly. If, at a future time, repairs are necessary and the outer conductor has become permanently distorted, so that the disc is still tightly held to the outer conductor 10, and should it be desired to remove the disc, the previous distortion may be relieved and the disc loosened if the band 1 is rotated approxi-

mately 60° and slightly re-tightened, as shown in Fig. 4. This operation will again place the tube in its normal true diameter.

This invention should not be limited to the precise arrangement shown.

What is claimed is:

1. A device for clamping insulators within the outer conductor of a transmission line, comprising a metallic tube, a plurality of insulators located within said tube, each insulator having a central aperture, an inner conductor passing through the central aperture in said insulators, means for retaining said insulators in spaced relationship, said means including a split band clamp, threaded means located at the open end of said band clamp for drawing the ends together, a plurality of wedge-shaped members secured to said clamp for distorting said metallic tube at a plurality of radial spaced points adjacent said insulators to grip and retain them in position within said tube.

2. A device for clamping insulators within the outer conductor of a transmission line, comprising a metallic tube, a plurality of disc-shaped insulators located within said tube, each insulator having a central aperture, an inner conductor passing through the central aperture in said insulators, means for retaining said insulators in spaced relationship, said means including a split band clamp, threaded means located at the open end of said band clamp for drawing the ends together, a plurality of widely spaced double wedge-shaped members having their thickened portion located at the sides of said band, said wedge-shaped members secured to said clamp

for distorting said metallic tube at a plurality of radial spaced points adjacent the disc-shaped insulators to grip and retain them within said tube.

3. A device for clamping insulators within the outer conductor of a transmission line, comprising a metallic tube, a disc-shaped insulator located within said tube, each insulator having a central aperture, an inner conductor passing through the central aperture in said insulators, means for retaining said insulator within said tube including a split band clamp with means for drawing the open ends together, a plurality of widely spaced wedge-shaped members transversely located on said clamp, said wedge-shaped members having their thinner edge located in the center portion of said band clamp for providing distortion of the tube at a plurality of radial spaced points adjacent each side of said insulator to retain it within said tube.

4. A device for clamping insulators within the outer conductor of a transmission line, comprising a metallic tube, a disc-shaped insulator within said tube, each insulator having a central aperture, an inner conductor passing through the central aperture in said insulators, means for retaining said insulator including a split band clamp with means for drawing the open ends together, a plurality of spaced members located approximately 120 degrees apart, said spaced members secured to said clamp for distorting said tube at a plurality of radial spaced points adjacent the insulator to grip and retain it within said tube.

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