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2,452,572

DELAY LINE

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FIG.1.

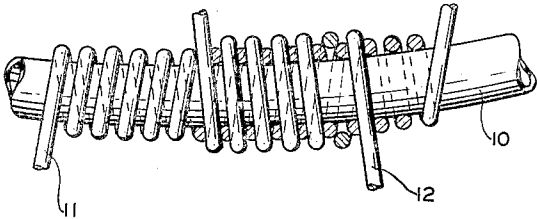


FIG.2.

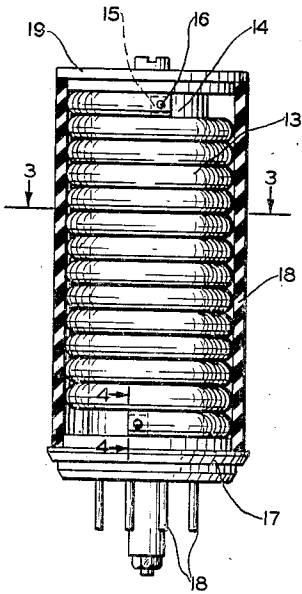


FIG.3.

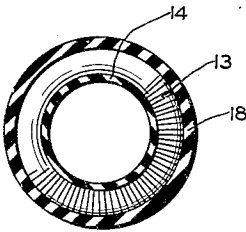
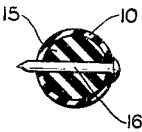


FIG.4.



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DELAY LINE

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1 Claim. (Cl. 178—44)

(Granted under the act of March 3, 1883, as
amended April 30, 1928; 370 O. G. 757)

1

The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

My present invention relates to artificial transmission lines, and more particularly, to a distributed-constant transmission line for delaying electrical pulses, or variations in the magnitude of electrical energy.

I have found that where the space available is not limited so as to restrict physical dimensions, it is an easy matter to design a delay line. However, I have also found that where the space available is limited, and it is necessary to impose restrictions on physical size, it becomes difficult to design such a line without introducing serious phase distortion.

Hence, it is the main object of my present invention to design a delay line which provides a predetermined fixed delay per unit length, and which introduces no undesirable phase distortion, notwithstanding the physical size thereof, particularly, the diameter, being restricted to much narrower limits than has heretofore been the case.

It is a further object of my present invention to provide a delay line having the foregoing characteristics, which is simple in construction, easy and economical to fabricate and assemble, and admirably adapted to perform its intended functions.

These, and other objects and advantages of my present invention, which will be better understood as the detailed description thereof progresses, are attained in the following manner:

I provide a flexible core with a least two oppositely and spirally wound layers of wire, and then coil the resulting line about a suitable form to present a helix, the turns of each layer being so spaced from each other as to permit said helix to be of very small diameter. Said form, after having the ends of the core suitably secured thereto, is mounted upon a standard tube base. To appropriate prongs of said tube base, I electrically connect the ends of the wires constituting the line, the opposite terminals of the line remaining open or being shorted, depending, in a well known manner, upon the use to which said line is to be put.

In the accompanying specification there is described, and in the annexed drawing shown, what is at present considered a preferred embodiment of the delay line of my present invention. It is, however, to be clearly understood that my present invention is not limited to said embodiment,

2

inasmuch as changes therein may be made without the exercise of invention and within the true spirit and scope of the claim hereto appended.

In said drawing,

Figure 1 is a partial elevation, partial section, showing the method of winding the aforementioned flexible core;

Figure 2 is a vertical section of the completed line;

Figure 3 is a transverse section taken along line 3—3 of Figure 2; and

Figure 4 is a like section taken along line 4—4 of said Figure 2.

Referring now more in detail to the aforesaid preferred embodiment of my present invention, with particular reference to Figure 1 of the drawing, the numeral 10 designates flexible tubing upon which is spirally wound a first layer of insulated wire 11, the spacing between successive turns of said layer being equal to about one-half the diameter of the wire. Wound about said first layer, in the opposite direction, is a second spiral layer of insulated wire 12, the successive turns of said second layer being spaced similarly to those of said first layer, and being, therefore, partially disposed within the spaces between the turns of said first layer.

The length of tubing wound, as aforesaid, with wire, depends upon the delay which it is desired to build into the line, said delay being directly proportional to the length of the line.

The resulting flexible, wire-wound core 13 is helically coiled, as best seen in Figure 2, about an insulated form 14 of suitable diameter depending, as in the case of the length of the line, upon the desired delay, both ends of the core being closed with plugs 15 secured in place by pins 16 which, as shown may also serve to fasten the coiled core to said insulated form.

Said insulated form 14 is preferably mounted upon a standard tube base 17 provided with the usual prongs 18, the lower free ends (not shown) of the wires 11 and 12 being electrically connected to two of said prongs 18, and the upper free ends (also not shown) of the wires 11 and 12 being open or shorted depending upon the use to which the line is to be put. Thus, the line may be used as a two or four-terminal line.

The coiled core 13 is enclosed in a tubing 19 which may be fastened in place by a removable cap 19.

This completes the description of the aforesaid preferred embodiment of my present invention. It will be noted that I have provided a delay line which, because of the manner of forming the

3

same, enables the attainment of relatively long delays without requiring very much space. Furthermore, in view of the fact that the line has no discontinuities, no undesirable phase distortion is introduced. Finally, it will be noted that the line is simple in construction, and easy and economical to fabricate and assemble.

Other objects and advantages of my present invention will readily occur to those skilled in the art to which the same relates.

I claim:

A delay line comprising: a flexible core provided with a first spirally-wound layer of insulated wire, and a second similarly wound layer of insulated wire; said layers being wound in opposite directions and each having its turns spaced by a distance equal to about one-half the diameter of said wire; the resulting wire-wound core being coiled in the form of a helix about an insulated support; means for securing the free ends of said helical wire-wound core to said support, said means comprising dielectric plugs positioned at the ends of said flexible core and pins

4

extending through said core and said plugs and engaging said insulated support, a second insulated support enclosing said delay line, and terminal socket means electrically continuous with said delay line and mechanically engaged by said insulated supports.

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10 The following references are of record in the file of this patent:

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