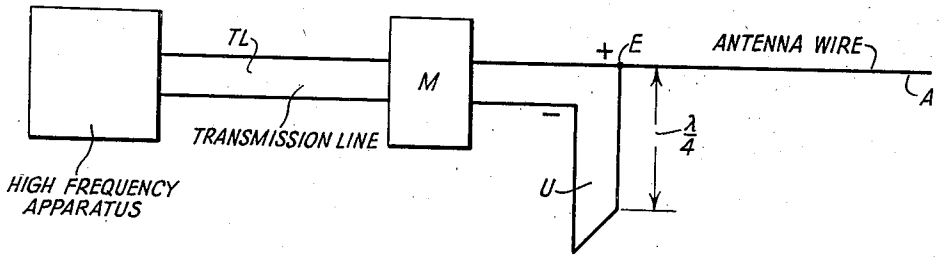
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TRANSMISSION LINE SYSTEM

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TRANSMISSION LINE SYSTEM

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The present invention relates to transmission line systems, and particularly to a method of feeding a single line antenna from a two-wire transmission line.

One difficulty hitherto experienced in feeding a single wire type of antenna from its end by a two-wire transmission line has been the creation of a very bad unbalance with respect to neutral or ground caused by such method of feeding. This is caused because the antenna acts as an energy absorbing load on one wire of the line, while the other wire of the line is open-ended. With such an unbalance, the current is not only greatly different in the two wires of the transmission line, but the amount of reflection in one wire may be greatly in excess of that in the other wire of the line. In this case the transmission line, as well as the antenna wire, acts as a radiation system, the two radiations combining to give an undesired characteristic. It is for this reason that this type of feeding has gone into disuse, and nearly all single antenna wires are now fed at their centers. One serious objection to feeding single long wires at their centers, however, is due to the change in phasing between halves of the antenna wire, and the consequent great change in the radiation characteristic thereof, whenever the frequency of the system is changed. Moreover, occasions arise where end feed of a single antenna wire is desirable; for example, in those cases where it is desired to take advantage of the traveling wave effect of a long wire.

The present invention provides an arrangement for feeding a single wire type of antenna from one of its ends in a manner such that the unbalance of currents in the two-wire transmission is greatly reduced. More specifically, the invention consists in providing a loop whose legs are each a quarter wavelength long or the same odd multiple thereof, between that end of antenna wire which is connected to one of the wires of the transmission line and the other wire of the line. Putting it another way, the overall length of the loop is one-half wavelength or an odd multiple of one-half wavelength. In this way, the antenna wire tends to load both sides of the transmission line.

A better understanding of the invention may be had by referring to the following description which is accompanied by a drawing illustrating the principles of the invention.

The single figure of the drawing illustrates a single line antenna wire A to which is coupled, at one of its ends E, a two-wire transmission line TL, which extends through a suitable impedance matching circuit M to high frequency transmitting apparatus. One side of line TL, herein marked plus, is shown directly connected to one end E of antenna A, while the other side of the line, herein marked minus is connected to E through a loop U, whose legs are each approximately an odd multiple including unity of one-quarter the length of the communication wave. It will thus be seen that the current flow from the side of line TL marked minus is shifted 180° in phase upon reaching E after passing through the total overall length of one-half wave, or odd multiple thereof, included in the loop U, and at this point is in phase with the current in the wire marked plus.

In one particular embodiment employed in practice, a single wire antenna nine wavelengths long functioned satisfactorily.

The invention finds application to any antenna wherein a two-wire transmission line may feed or be connected to the end of a single wire antenna, irrespective of whether said antenna is used alone or in combination with other antenna wires to form a system giving a desired characteristic.

By the term "odd multiple", as used in the description and claims, is meant any odd multiple including one.

What is claimed is:

1. An antenna comprising a wire, a two-wire transmission line having one of its wires connected to one end of said antenna wire and its other wire connected through an electrically conducting loop having an overall length substantially an odd multiple of half the communication wave to said same end.

2. An antenna system comprising, in combination, an antenna wire, a two-wire transmission line, one of said wires of said line being connected to one end of said antenna wire, and an electric circuit equivalent to an electrically conducting loop having an overall length equal to an odd multiple of half the length of the communication wave connecting the other wire of said line with said one end of the antenna.

3. An antenna comprising a single wire antenna nine wavelengths long, a two-wire transmission line one of whose wires is connected at one end to one end of said antenna, and an electrically conducting loop whose overall length is one-half the length of the communication wave connecting said one end of said single antenna wire to the adjacent end of said other wire of said transmission line.

4. In combination, an antenna and a multiconductor feeder having one of its conductors coupled to one end of said antenna and another conductor thereof coupled to said same end of said antenna through an electrical circuit equivalent to an electrically conducting loop having an overall length substantially equal to an odd multiple of half the length of the communication wave.

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