

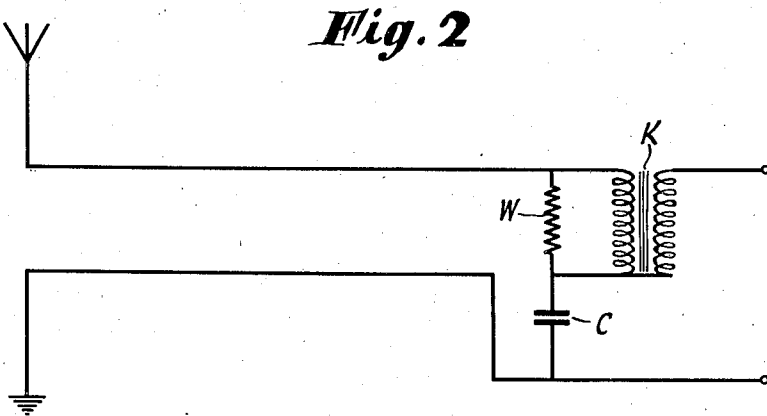
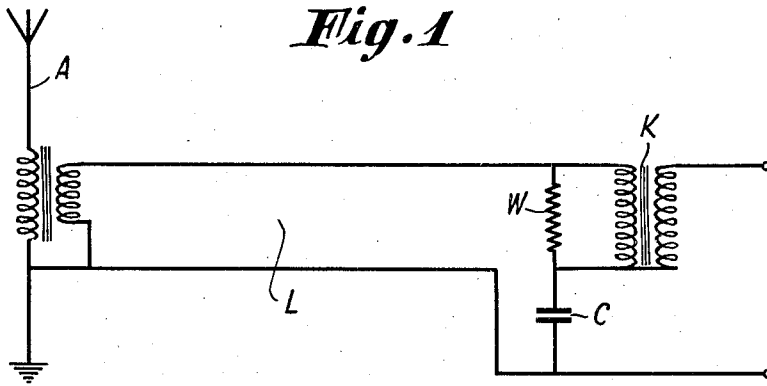
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RECEIVER ARRANGEMENT

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RECEIVER ARRANGEMENT

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4 Claims. (Cl. 178—44)

According to U. S. Patent No. 2,112,320, assigned to the same assignee as the present application, it is proposed in connection with a receiving arrangement to terminate the double wire line connected to the antenna with a resistor having the value of the wave resistance, i. e., surge impedance and across a filter pervious only to high frequencies, whereby said resistor is chosen for the high frequencies for which the capacitive resistance of the double wire line is lower than its wave resistance. Furthermore, in this case the antenna is matched with a resistance that is higher than the wave resistance, more especially matched with the resistance of the double wire line which is a capacitive resistance for lower frequencies.

The advantage of the suggestion according to said patent resides in the following. A terminal resistor is necessary since in the absence of the latter, standing waves would appear in the short wave range. On the other hand, however, a terminal resistor has a disadvantage in case of broadcast waves and long waves since the matching i. e. the proportion between the resistance of the cable or double wire line and the antenna resistance is a poor one. The antenna resistance being primarily a capacitive resistance, will then be higher than in the case of short waves so that it is high as compared with the wave resistance whereby only a small part of the total antenna voltage appears thereat. For this reason according to the patent the terminal resistor is rendered ineffective in the case of broadcast waves and long waves and for these wave ranges the antenna is accurately or approximately matched with the capacitive resistance of the cable. Since in this case both the antenna resistance and the cable resistance are capacitive, the proportion between both and hence the matching has always the most favorable value throughout the broadcast wave range and long wave range.

With the present invention the short wave reception in such a receiving arrangement is improved in a simple manner. Herein lies an advantage in view of the fact that in the receiver as well as in an antenna amplifier eventually present the short waves are detrimentally affected.

In accordance with the invention, the terminal resistor utilized in a receiving arrangement according to the above mentioned patent has a transformer connected thereto which is designed for the high frequencies at which the terminal resistor is effective and whose secondary winding

has one end connected to the point at which the terminal resistor and the filter are joined, while the other end of the filter and the free end of the secondary winding form the output terminals.

Fig. 1 represents the invention as applied to one type of antenna;

Fig. 2 represents the invention as applied to a different type of antenna.

According to Figure 1 the antenna A is matched with the double wire line L across a transformer more especially with the capacitive resistance of the double wire line. The terminal resistance whose value is that of the wave resistance of the line is designated by W. This terminal resistor is connected in series with a condenser C which in this case assumes the task of the filter since only in the shortwave range does it permit the terminal resistor W to become effective. Thus it is in this range where the essential part of the voltage appears at the terminal resistor W and is transmitted across the short wave transformer K. On the other wave ranges the main voltage is developed across the condenser C so that the series connection of the primary and secondary winding of the transformer K solely has the effect of a lead-in. In fact the short wave transformer has but a few windings. The output is connected either to one or several receivers, or to an antenna amplifier from which the energy is passed to the receivers across a second double wire line.

In the example of construction according to Figure 2 no transformer is provided between the antenna and the double wire line. This condition exists when using the principle of the above patent in the case in which the capacity of the cable is of the order of the antenna capacity because in this case a transformer is no longer required since its transformation ratio does not then differ appreciably from the ratio 1:1. This condition exists if for instance a rod antenna has a capacity of 60 mf. while a rather short cable need simply be used for instance of a length of 7 m. and having a capacity of 200 mf. when figuring with a capacity of 30 mf. per meter. Since such a cable still has a length requiring termination of the cable on the short wave range ($\frac{1}{4}$ of a wave of 28 m. being equal to the length of the cable), it would be necessary to provide an antenna transformer for the broadcast waves and long waves unless the idea of the above patent is used. In fact, if at a wavelength of 60 m. the capacitive resistance of this cable is 150 ohms so that as regards value it does not

differ from the usual value of the wave resistance of 150 ohms, the capacitive resistance of this cable is already 50 ohms at a wavelength of 200 m., and 5000 ohms at a wavelength of 2000 m. Therefore, in case of a fixedly connected terminal resistor and without the use of an antenna transformer, i. e., without utilizing the idea of the above patent there would be obtained in the range between 200 m. and 2000 m. a voltage division and hence a loss of 1:3 up to 1:30.

In the case of the short cable length assumed and in the circuit according to Figure 2 considered more especially for arrangements with antenna amplifiers, there is obtained a more uniform efficiency than without short wave transformer, since the difference is then especially large between the capacitive resistance of the cable on the broadcast wave range and long wave range and the wave resistance or matching with the input of the amplifier in case of short waves. In fact, an additional voltage increase can be obtained with the short wave transformer K since when employing the transformer there can be obtained a more favorable matching of the cable terminated by the low-ohmic wave resistance with the high-ohmic input of the antenna amplifier. In the case of broadcast waves and long waves, the cable such as already stated, has as such already a higher ohmic value, so that an additional transformer between cable and antenna amplifier would for these wave ranges not bring about a particular advantage. Nevertheless it would be possible in Figure 2 and especially in Figure 1 to place in parallel to the output terminals one or several parallel transformers for the broadcast waves and long waves eventually by connecting chokes ahead thereto.

I claim:

1. In a receiving system for receiving waves over long and short wave ranges, an energy collector, a two conductor transmission line connected at one end to the collector, said transmission line having a length which is at least comparable to a wave length at a short wave range, a transformer having a primary winding and a secondary winding, a condenser and an impedance means connected in series across the other end of the line, said impedance means including said primary winding and having substantially the same value as the surge impedance of

the line, a pair of terminals for connecting the line to a utilization device, and means including the secondary of said transformer and said condenser in series for connecting said two terminals together.

2. A receiving system for receiving waves over a wide range of frequencies comprising an energy collector, a two-conductor transmission line coupled at one end to the collector, said transmission line having a length comparable to a wave length having the highest frequency of said range but small in length compared to a wave length corresponding to the lowest frequency of said range, a terminating resistance and a condenser connected in series across the line, said terminating resistance having substantially the same value as the surge impedance of the line, a short wave transformer having a primary winding and a secondary winding, a pair of terminals adapted to be connected to a utilization device, means for connecting the primary winding of said transformer across said terminating resistor, and a connection between said two terminals, said connection including the secondary of said transformer and said condenser in series.

3. An input circuit for a short wave and long wave receiver comprising an antenna, a transmission line having one end coupled to the antenna, the other end of the transmission line having a filter constituted by a resistance and a capacity connected across the line, and a high frequency transformer, the primary of which is connected across the filter resistance and the secondary of which together with the filter condenser constituting the output circuit which is adapted to be connected to the input of the receiver.

4. A circuit for coupling a short wave and long wave receiver to an antenna, comprising a transmission line having one end coupled to the antenna, a filter constituted by a series resistance and capacity connected across the transmission line at the other end, a high frequency transformer having its primary connected across the filter resistance, a pair of output terminals adapted to be connected to the input of the receiver, said output terminals having connected between them the secondary of the high frequency transformer and the capacity of the terminating filter.

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