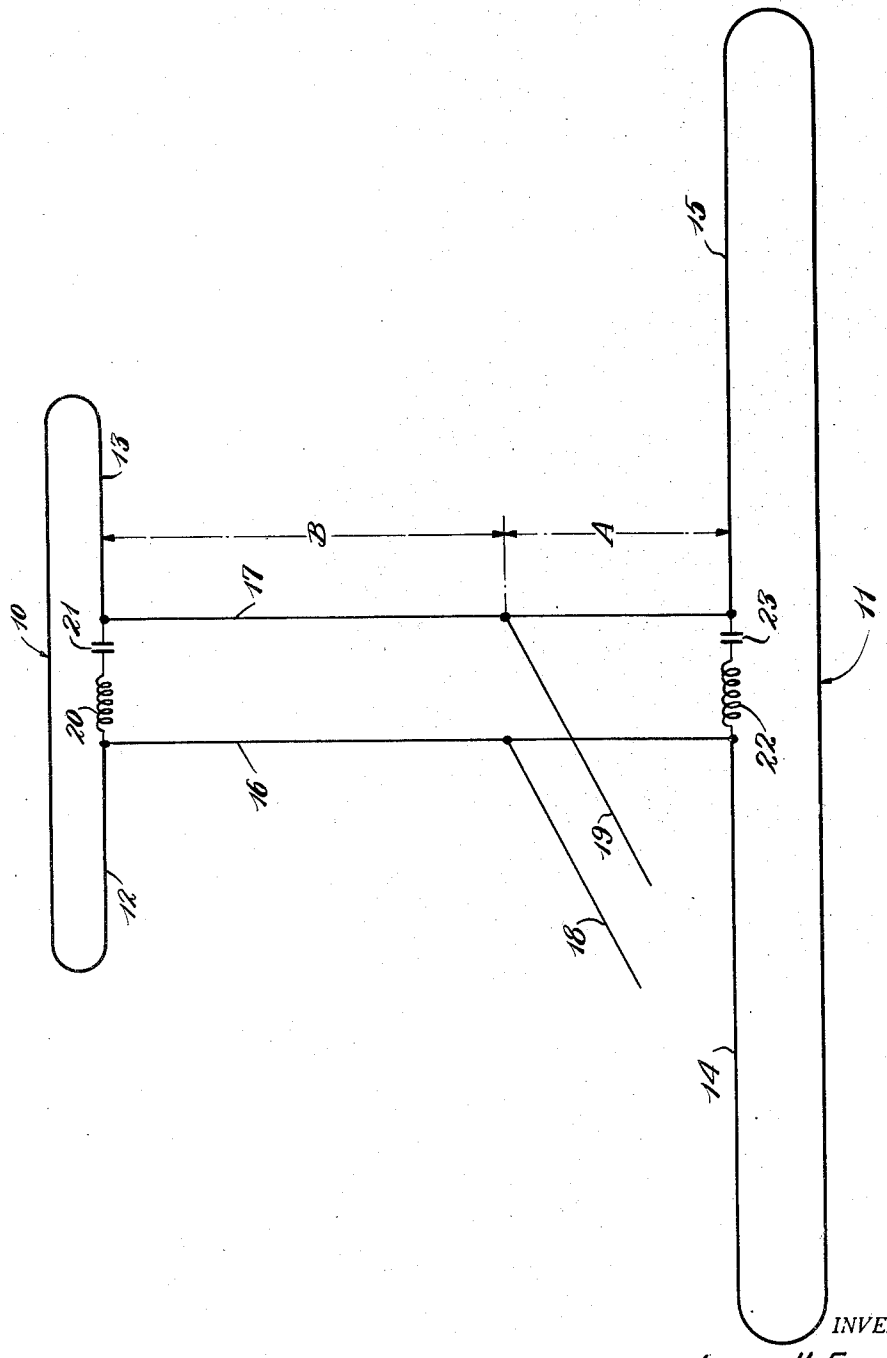
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ANTENNA CIRCUIT

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ANTENNA CIRCUIT

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This invention relates to an antenna circuit or system and more particularly to an automatic antenna selector system.

The principal object of the invention is the provision in a multi-antenna system including a high frequency antenna and a low frequency antenna of means for automatically maintaining in the circuit the desired antenna and for isolating from the circuit the undesired antenna, depending upon whether the high or low band receiving apparatus as, for example, a television set, is adjusted for high frequency or low frequency reception.

Another object is to provide an improved and novel electrical antenna selector system which may be advantageously employed wherever a high and low band antenna is connected to a common transmission or lead-in line.

A further object is to provide an electrical antenna selector system which may be advantageously employed in multi-antenna arrays which include high and low band antennas.

Another object is to provide an antenna system for use with radio and television receiver sets capable of receiving both high and low frequency signals and which system includes a high frequency antenna and a low frequency antenna together with simple and efficient means directly associated with the antennas for automatically isolating the low frequency antenna from the circuit when the set is adjusted for high frequency reception or for automatically isolating the high frequency antenna from the circuit when the set is adjusted for low frequency reception.

Further and additional objects and advantages not expressly set forth above will become apparent during the detailed description of an embodiment of the invention which is to follow.

The accompanying drawing is a diagrammatic or schematic showing of an antenna system embodying the invention and including high frequency and low frequency antennas connected to a common transmission or lead-in line.

For the purpose of explaining the invention a high frequency antenna 10 and a low frequency antenna 11 are illustrated. The antennas 10 and 11 are shown for illustrative purposes as of the folded dipole type but it will be understood they could be of the straight dipole type as well.

A wiring harness connects the terminals of the antennas 10 and 11 and comprises wires 16 and 17 connected, respectively, to the arms 12 and 14 and to the arms 13 and 15 of the antennas 10 and 11.

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It will be understood that the wires 16 and 17 of the wiring harness are connected to the arms of the antennas by the terminals at the ends thereof which are electrically spaced apart to provide an electrical gap. A transmission or lead-in line extending to the receiving apparatus (not shown) is connected to the wiring harness and comprises wires 18 and 19 connected, respectively, to the wires 16 and 17 of the harness.

The wires forming the wiring harness and the transmission or lead-in line are of similar size and form and the wires of the transmission or lead-in line are connected to the harness at a predetermined and critical point as, for instance, at a location one-quarter wave length at high frequency from the low frequency antenna as indicated by the arrowed lines A and one-quarter wave length at low frequency from the high frequency antenna as indicated by the arrowed lines B.

In carrying out the invention a low frequency series resonant circuit is in the gap between the arms 12 and 13 of the high frequency antenna 10 and is connected to the terminals of this antenna, and a high frequency series resonant circuit similarly is in the gap between the arms 14 and 15 of the low frequency antenna 11.

The low frequency series resonant circuit may comprise a suitable radio frequency choke coil 20 and a condenser 21 in series therewith, while the high frequency series resonant circuit similarly may comprise a radio frequency choke coil 22 and a condenser 23 in series therewith.

As illustrative of a specific arrangement which may be employed with respect to the wiring harness and the low and high frequency series resonant circuits the following is set forth:

The wiring harness may be constructed of 300 ohm twin lead wire while the transmission line may be connected to the harness at 11½" from the low frequency antenna 11 and at 34¾" from the high frequency antenna 10, assuming such distances to correspond, respectively, to one-quarter wave length at high frequency and one-quarter wave length at low frequency.

The low frequency series resonant circuit may consist of a .5 microhenry choke coil 20 in series with a 14 micromicrofarad ciramicon condenser. The high frequency series resonant circuit may consist of a .22 microhenry choke coil 22 in series with a 3 micromicrofarad ceramicon condenser 23. The series resonant circuits comprising the small radio frequency choke coils and the small ceramicon condensers can be formed as units and placed directly across the gaps between the

arms of the antennas and on the antenna insulators, thus providing a simple arrangement and a neat appearance.

The antenna system hereinbefore described functions as follows: Assuming it is desired for the receiving set to receive high frequency signals, the high frequency series resonant circuit consisting of the coil 22 and the condenser 23 and extending across the low frequency antenna 11 approaches zero impedance. This low or zero impedance at the point where the transmission line is connected to the wiring harness that is one-quarter high frequency wave length along the harness from the low frequency antenna 11 is reflected back as a very high impedance, wherefore the low frequency antenna 11 is electrically disconnected or isolated from the antenna system. The low frequency series resonant circuit consisting of the coil 20 and condenser 21 and placed across the high frequency antenna 10 has substantially no effect at high frequency on the antenna 10 since the low frequency series resonant circuit attains a high impedance at high frequencies and in electrical effect is disconnected from the antenna 10, wherefore the antenna 10 functions in the ordinary manner of a high frequency antenna for the reception of high frequency signals.

Assuming that the receiving set has been adjusted for the reception of signals at low frequency then the high frequency antenna 10 is automatically electrically isolated from the system and the low frequency antenna 11 functions as an ordinary low frequency antenna. In this situation the low frequency series resonant circuit composed of the coil 20 and the condenser 21 across the gap of the high frequency antenna 10 attains substantially to zero impedance and this low impedance is reflected back as an extremely high impedance at the point where the transmission line is connected to the wiring harness, that is at a point which is one-quarter wave length at low frequency from the antenna 10. Consequently the high frequency antenna 10 is isolated electrically from the system.

Under this latter condition the high frequency series resonant circuit composed of the coil 22 and condenser 23 and placed across the low band antenna goes to a very high impedance on the low frequency signals and thus is effectively electrically disconnected from the low frequency antenna 11 and has no effect thereon.

From the foregoing description it has been delineated that the invention provides a simple and efficient antenna system for use with receiving apparatus of the high and low frequency type and which system includes high and low frequency antennas and means for automatically and electrically isolating from the circuit one or the other of the antennas, depending upon whether the receiving apparatus is adjusted for high frequency reception or for low frequency reception.

It will also have been noted that the advantages accomplished by the antenna system embodying the invention eliminates the necessity of employing expensive selective and operative equipment for isolating one or the other of the antennas and necessitates only the use of simple, inexpensive low and high frequency series resonant circuits and the proper connection of the transmission line to the wiring harness between the antennas. Once the system is installed the electrical isolation of either the low or the high frequency antenna is automatically obtained merely by adjusting the receiving apparatus for high or low frequency reception as the case may be.

Although a preferred embodiment of the invention has been illustrated and described herein, it will be understood that the invention is susceptible of various modifications and adaptations within the scope of the appended claims.

Having thus described our invention, we claim:

1. An antenna system for high and low wave frequency reception comprising a high frequency dipole antenna, a low frequency dipole antenna, a wiring harness interconnecting the terminals of said antennas, a low frequency series resonant circuit between the terminals of said high frequency antenna, a high frequency series resonant circuit between the terminals of said low frequency antenna, and a transmission line adapted to extend to suitable high and low band receiving apparatus and connected to said wiring harness at a point so located with respect to said antennas that for high frequency reception the substantially zero impedance in the high frequency series resonant circuit across the low frequency antenna will be reflected back at said point of connection as a very high impedance, thus electrically and automatically isolating the low frequency antenna and similarly for low frequency reception the substantially zero impedance in the low frequency series resonant circuit across the high frequency antenna will be reflected back at said point of connection as a very high impedance thus electrically and automatically isolating the high frequency antenna.

2. An antenna system as defined in claim 1 and wherein the low and high frequency series resonant circuits each includes a radio frequency choke coil in series with a condenser.

3. An antenna system as defined in claim 1 and wherein the transmission line is connected to said wiring harness at a point-one-quarter wave length at low frequency from said high frequency antenna and one-quarter wave length at high frequency from said low frequency antenna.

4. An antenna system for high and low wave frequency reception comprising a high frequency dipole antenna, a low frequency dipole antenna, a wiring harness interconnecting the terminals of said antennas, a low frequency series resonant circuit between the terminals of said high frequency antenna, a high frequency series resonant circuit between the terminals of said low frequency antenna, said resonant circuits each including a radio frequency choke coil in series with a condenser, and a transmission line connected to said wiring harness at a point one-quarter wave length at low frequency from said high frequency antenna and one-quarter wave length at high frequency from said low frequency antenna.

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