

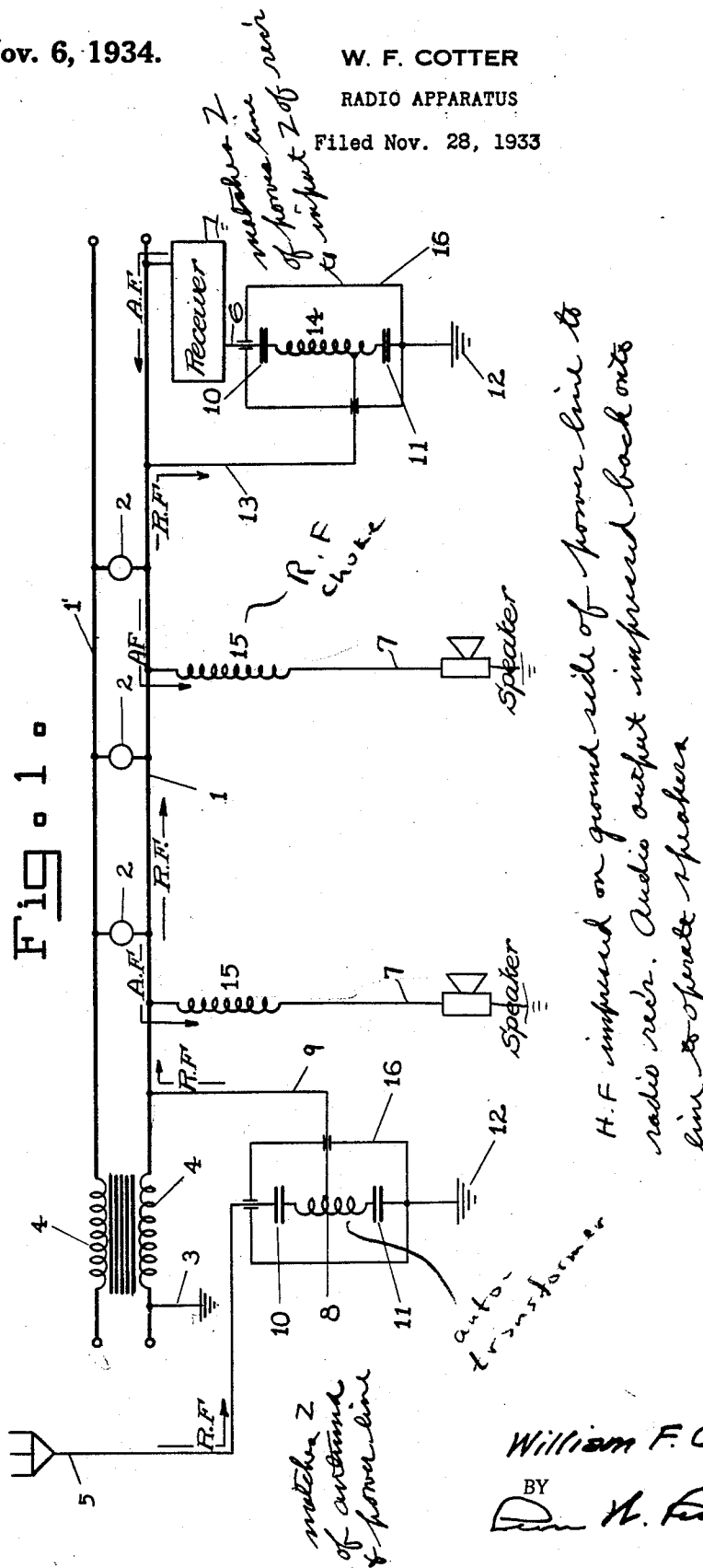
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RADIO APPARATUS

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RADIO APPARATUS

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6 Claims. (Cl. 179-2.5)

This invention relates to improvements in radio apparatus and more particularly to apparatus for employing the conductors of a lighting or power circuit for conveyance of high frequency signals.

An object of the invention is to provide means for enabling a receiving antenna to be connected to a power or lighting circuit at any available outlet and for enabling the receiver to be similarly connected to the same circuit at another convenient outlet, so that the signals received can be conducted from the antenna to the receiver over a power conductor as a transmission line; and by suitable appliances to transfer the output of the receiver over a conductor of the power or lighting circuit to suitable apparatus, such as a loud speaker, by which a program can be rendered audible.

A further object of the invention is to provide a system of this type which can be easily produced at relatively low cost, easily connected and operated in a practical manner with certainty and efficiency.

On the drawing the figure discloses one or more embodiments of the invention; but the right is of course reserved to make any changes which do not depart from the principle of the invention or exceed the scope and spirit of the appended claims.

On the drawing:

The figure is a circuit diagram showing how the invention is connected.

The numerals 1 and 1' indicate a pair of conductors for a light or power circuit which supply current for lamps or other translating devices indicated at 2. These conductors are connected to a suitable source of current, and the conductor 1 on the "low" side of the line is grounded at 3. Between the ground point and the translating devices 2 are reactor coils 4, one of which is in the line of each of the conductors 1 and 1', and the grounded connection 3 must be placed between these reactors and the source of energy which supplies the conductors 1 and 1'. The coils 4 are inductively related and operate as set forth in the application of Marion C. Bond and myself, for patent on a Program distribution system, filed March 23, 1933, Serial No. 662,252, which states that they are wound in opposition to one another, and the resultant of the magnetic fields created by power current is zero. Higher frequencies flowing along one side of the power line are stopped by the reactance, as a balanced magnetic field is not thus created.

A receiving antenna is indicated at 5 and radio signal oscillations picked up by this antenna are passed along over the conductor 1 and a conductor 6 to the antenna terminal of a radio receiver. The output of this receiver is impressed upon the conductor 1 and is led off by way of conductors 7 to loud speakers or miscellaneous equipment or other program reproducing apparatus. Hence with this system the antenna can be connected to any convenient outlet of the power or lighting circuit and the receiver can likewise be connected thereto at another point; while the loud speakers or such can be joined to the power line at other points. Thus the antenna might be connected in one room, and the receiver may be in another room connected to the power line at a socket or outlet therein; and finally the conductors 7 may be united to the conductor 1 in still other rooms of the house or building. Then when the radio set is in operation, high frequency oscillations will be conducted to it over the antenna 5, conductor 1 and lead 6; and audiofrequency oscillations from the receiver will be imposed upon the conductor 1 and transmitted to the conductors 7.

In the line of the antenna 5 is an auto-transformer 8 connected by a tap 9 directly to the conductor 1 at any point thereon so that the coils 4 will be between this point and the source of supply. At the ends of the transformer 8 and in series therewith are condensers 10 and 11, the latter being grounded at 12. The transformer is thus coupled in the conventional way to the low tension side of the power line and the transformer 8 matches the impedance of the antenna circuit with the low impedance of the power line. A conductor 13 joins to the low tension conductor of the power line another transformer 14; this conductor being united to the conductor 1 at any point so that the coils 4 may be between it and the source of supply; and the other end of this conductor being connected to a suitable tap in the transformer 14. In series with this transformer are condensers 10 and 11, the former being between this transformer and the conductor 6 and the latter between the transformer and the ground connection 12. The transformer 14 matches the low impedance of the line with the higher input impedance of the receiver.

From the output end of the receiver the signal oscillations of audiofrequency are impressed upon the conductor 1 by a conductor, not shown, connected to said conductor 1, at any point so that the coils 4 may be between it and the

source of supply; and these oscillations pass through radiofrequency choke coils 15 to the conductors 7. The conductors 7 and coils 15 are of course joined to the conductor 1 at any suitable point so that the coils 4 will lie between the source of supply for the conductors 1 and the conductors 7.

In practice, the received oscillations come in by way of the antenna 5 and pass by way of the conductor 9 to the conductor 1 and thence to the conductor 13 and transformer 14. They are conveyed over the conductor 6 to the receiver, which impresses audiofrequency oscillations on the conductor 1. These low frequency oscillations alone can pass out over the conductors 7, because the radiofrequency oscillations are stopped by the coils 15.

The transformer 8 with the condensers 10 and 11 and the transformer 14 with the condensers 10 and 11 are both enclosed in a casing 16 of such material that it acts as a shield and protects these transformers against disturbances.

Having described the invention what is claimed is:

1. The method of receiving radio signals which consists in impressing the same on a power line, conveying them to a receiver, changing the frequency of said signals, conducting the output of said receiver to said power line and transmitting the output of the receiver from said power line to a desired point, and means for confining said signals and receiver output to a predetermined section of said power line.

2. The method of receiving radio signals which consists in impressing radiofrequency oscillations upon the conductor of a power line, transmitting said signals to a radio receiver, detecting said signals, impressing the audiofrequency oscillations delivered by said receiver upon said power line, and conducting said audiofrequency oscillations from the power line to one or more desired points, and at the same time obstructing the transmission of radiofrequency oscillations to said points.

3. An apparatus for receiving radio signals

comprising an antenna, means for coupling the same to the grounded conductor of a power line, means for coupling a radio receiver to said conductor, means for changing the frequency of said signals, means for impressing said changed signals on said conductor, and connections from said conductor to convey said changed signals to one or more desired points, said connections having means therein for obstructing the passage of radiofrequency oscillations thereon.

4. Radio receiving apparatus comprising an antenna, means for coupling the antenna to the grounded conductor of a power-line, means for coupling to said conductor a radio receiving set means for changing said signals to audiofrequencies, means for impressing said audiofrequencies on said conductor, and connections containing radiofrequency choke coils to convey the output of said receiver from said conductor to one or more desired points.

5. Radio signal receiving apparatus comprising an antenna, means for coupling said antenna to the grounded conductor of a power line, a receiving set having a detector coupled to said conductor, means for impressing said receiver output on said conductor, a translating device connected to said conductor, and means for restraining said signals and said receiver output to a predetermined portion of said grounded conductor, said means comprising a reactance coil in each side of said power line, said coils being wound to be in magnetic opposition.

6. In a system for receiving and distributing radio programs, the combination of a power line having one grounded side, a radio antenna connected to said grounded side, a receiver having its input and output connected to said grounded side, a circuit including a radiofrequency choke connecting a translating device to said grounded side, and means for restraining said program to a predetermined section of said power line, said means comprising a reactance coil in each side of said power line, said coils being wound to be in magnetic opposition.

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