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METHOD OF NEUTRALIZING DISTURBING ELECTRIC WAVES

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Fig. 1

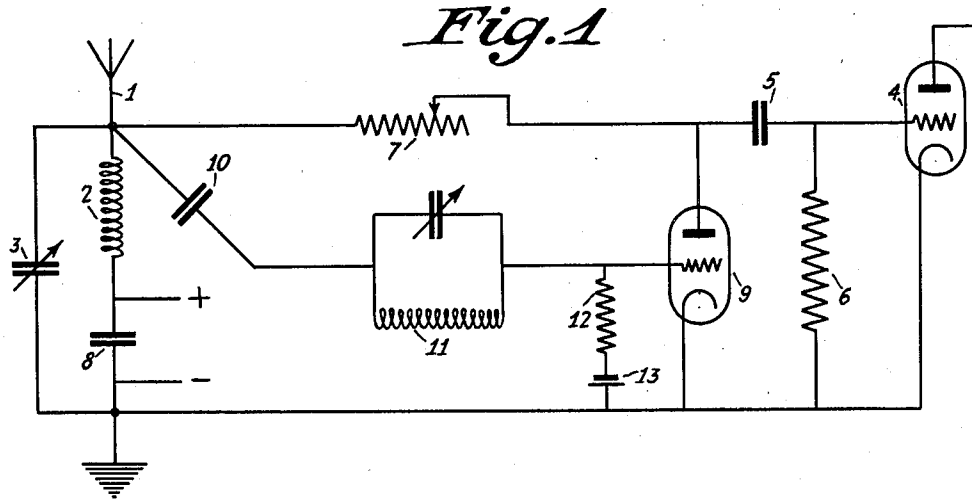
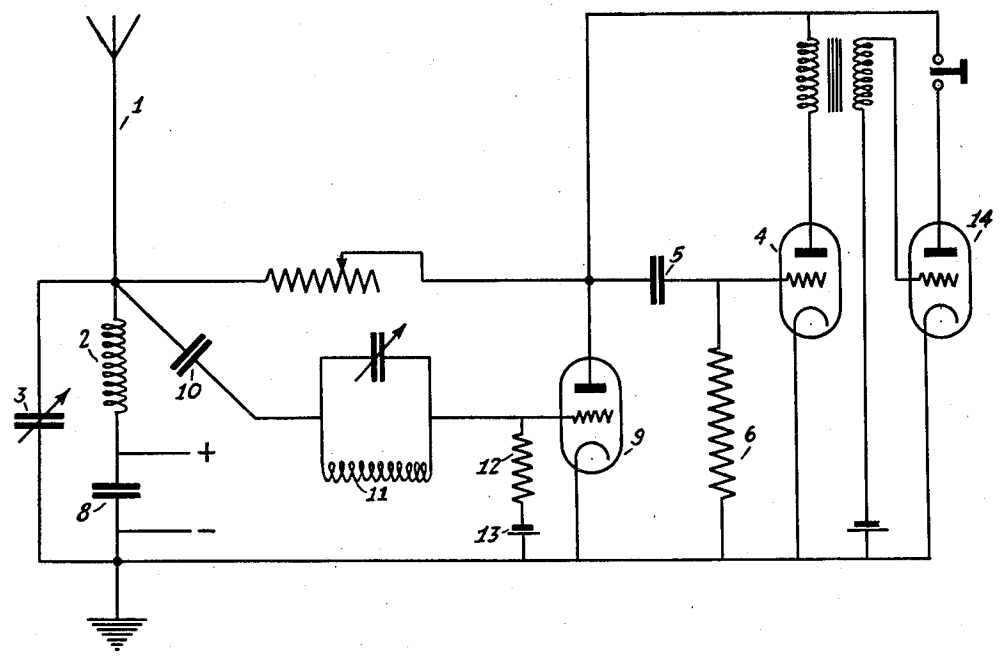


Fig. 2



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METHOD OF NEUTRALIZING DISTURBING ELECTRIC WAVES

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7 Claims. (Cl. 250—20)

It has been proposed to neutralize or eliminate stray waves or stray impulses in receivers by counter impulses. Now, according to the present invention, a particularly great effect is realizable if a resistance is inserted in one of the grid-circuits of the amplifier arrangement, and if a potential drop which is opposed to the stray impulses is produced across the said resistance.

The accompanying drawing shows a number of embodiments of the invention by way of example. Referring to Fig. 1, 1 is the antenna which is subject to stray oscillations of some sort. Numerals 2 and 3 denote the customary tuning means. The first thermionic tube 4 acts as a rectifier, and has the usual grid condenser 5 and grid leak 6. In order to prevent the grid of tube 4 from being affected by stray impulses, a resistance 7 (preferably adjustable of the regulable kind) is inserted in the lead between the inductance 2 and the grid of tube 4. In order to set up a potential drop across the said resistance which is opposed to the incoming stray waves, an auxiliary or compensator tube 9 is inserted between the grounded plate of the electrically large condenser 8 which is in series connection with the inductance coil 2, and the end of resistance 7. The resistance 7 is connected to the grid of tube 4. The plate potential for tube 9 is furnished by a current source connected to the armatures of condenser 8. In order to control and operate the tube 9 in such a way that the changes of the plate current will set up across resistance 7 a potential drop opposed to the stray impulses, the grid of tube 9 is connected with the ungrounded end of inductance coil 2. By the aid of condenser 10 the plate potential is cut off from the grid of tube 9. A rejector circuit 11 is adapted to prevent tube 9 from being influenced by the direct incoming waves. The usual leak resistance 12 is provided and a battery 13 supplies the biasing potential required for the grid of tube 9.

In order to explain the manner in which the invention operates, let it be assumed that an undesired frequency is impressed upon the aerial 1 and that the positive potential from this frequency is at the moment impressed upon the aerial 1. This positive potential passes thru the rejector circuit 11 and is impressed on the grid of the tube 9. This decreases the resistance of the tube 9 and as a result the plate potential is reduced which counteracts the increased positive potential caused by the stray frequency. Similarly a negative potential increases the resistance of the tube 9 and as a result the plate potential is increased which counteracts the negative potential from the stray frequency.

The rejector circuit 11 being tuned to the frequency of the signals to be received offers considerable resistance to the passage of the currents resulting from the potential set up by this frequency so that its effect upon the compensator tube is negligible and therefore its potential is not materially counteracted. The rejector circuit however offers little resistance to all other frequencies and the potentials set up by these frequencies materially affect the compensator tube and these same potentials passing thru the resistance 7 are counteracted by the compensator tube.

Instead of the rejector circuit 11, a series arrangement comprising condenser and self-inductance tuned to the incoming wave may be disposed between the grid and the filament of the compensator tube 9.

Instead of producing the potential fall opposed to the stray impulses in a distinct resistance, another suitable scheme would be to use a discharge tube and to arrange it in one of the grid circuits of the amplifier arrangement, the grid having to be acted upon in a suitable manner. If a multi-stage amplifier is used, it is not necessary to have the stray impulses neutralized ahead of the first stage or tube, for it could also be effected in the grid circuit of another tube.

Fig. 2 shows a receiving arrangement for wireless telegraphy or telephony in which the plate potential for the amplifier is taken from the same current source from which the plate potential for the compensator tube is furnished. The connection of the compensator tube is the same as in the scheme shown in Fig. 1. The same reference numerals are used for corresponding parts. The plate potential for amplifier tubes 4 and 14 is taken off at the plate of the compensator tube 9. The latter also eliminates whatever potential fluctuations due to the source may arise in the plate potential by setting up opposite potential drops across the resistance. Hence, direct-current generators or rectifiers may be used as the source to supply the plate potential.

What I claim is:

1. A circuit arrangement for neutralizing interfering waves in receiving apparatus having an input circuit comprising a three electrode discharge tube, a resistance in the plate circuit of said tube and directly connected in said input circuit, and means for varying the potential drop across said resistance in reverse phase to interfering signal potential drops across said resist-

ance so that the potential of the interfering waves is counteracted.

2. A circuit arrangement for neutralizing interfering waves in a receiving apparatus having an input circuit comprising a three electrode discharge tube, a resistance in the plate circuit of the tube and in said input circuit, means for applying the interfering potential to the plate circuit whereby the potential drop in said resistance is varied in accordance with the interfering signal, and means for counteracting the said variation comprising a circuit adapted to supply energy in accordance with the interfering waves, said circuit being connected to the grid of said three electrode tube and adapted to vary the plate current of the valve oppositely to the variations directly produced in the plate circuit by the interfering potentials.

3. A circuit arrangement for reducing interfering signals comprising a three electrode electron discharge device having a control electrode, an anode and a cathode; a resistance in series with the anode and cathode of said electron discharge device; an energy collector directly connected to said resistance for impressing interfering signal currents on said resistance for causing potential drops of interfering signal frequency thereacross, and a connection from said energy collector to the control electrode, cathode circuit of said electron device for applying interfering signal potentials thereto to vary the anode cathode current through said resistance in opposition to the potential variations produced by the interfering signal current flowing in said resistance.

4. A receiver circuit for reducing interfering signals comprising a three electrode valve; a resistance in series with the anode and cathode of said valve; an antenna circuit directly connected to said resistance for causing interfering signal currents to flow in said resistance thereby causing potential differences across said resistance at the frequency of the interfering signals and means for applying interfering signal potentials to the control electrode cathode circuit of said valve to cause the anode cathode current of said valve to flow in opposition to said interfering signal current in said resistance.

5. A receiver circuit adapted for the reduction of interfering signals comprising a first tunable input circuit; an electron discharge device comprising an anode, a cathode and a control electrode associated with said first input circuit; a resistance located between said input circuit and the anode of said vacuum tube, and a second tunable circuit connected between said first input circuit and the control electrode of said electron discharge device whereby interfering signal potentials set up across said resistance are compensated by the action of said electron discharge device setting up reversed phase interfering signal potentials across said resistance.

6. A circuit arrangement as defined in claim 3 including a utilization circuit coupled to the anode of said electron discharge device, said utilization circuit comprising an electron discharge device.

7. In a radio signalling system for the elimination of interference, the combination with a resonant grid circuit tuned to the working frequency, said circuit comprising an inductance in parallel with a condenser, of an electron discharge device having a control grid upon which high frequency oscillations are impressed by said resonant circuit, one plate of said condenser being directly connected to said control grid, and an output circuit therefor, and a connection including a resistance and a capacity directly connected between the other plate of the condenser of said resonant grid circuit and said output circuit.

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