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HANNS-HEINZ WOLFF

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RADIO CIRCUIT FOR ELIMINATING UNDESIRED INTERFERENCE

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Fig.1

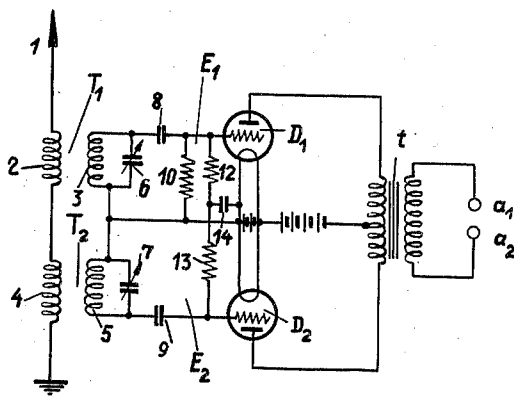
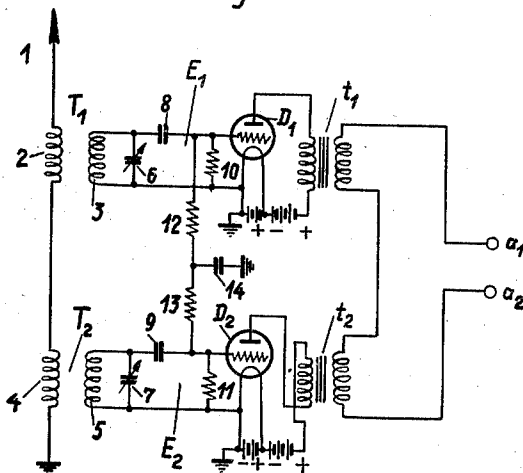


Fig.2

Inventor:

Hanns-Heinz Wolff

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RADIO CIRCUIT FOR ELIMINATING
UNDESIRE INTERFERENCE

Hanns-Heinz Wolff, Berlin, Germany, assignor,
by mesne assignments, to Loewe Radio, Inc., a
corporation of New York

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3 Claims. (Cl. 250—20)

The present invention is directed to an improvement in and simplification of the previously known circuit systems for eliminating interferences, particularly atmospheric interferences, in wireless receiving devices. Circuit systems have already become known, in which the interferences are compensated by the use of two similar receiving circuits. The one receiving circuit is tuned to the oscillations to be received, whilst the other receiving circuit is set to a wavelength which is adjacent to these received oscillations. The potentials amplified and rectified in the two receiving circuits are coupled to the output circuit, which includes the loudspeaker or the telephone, in such a manner that the interferences are compensated by the utilisation of a push-pull effect. This push-pull effect, obtained by phase reversal, is accomplished by suitable poling of the coupling means with respect to the common output circuit.

It has been found that in connections of this kind there is produced merely an incomplete compensation of the interferences occurring and this defective compensation is due to the fact that the two receiving circuits exhibit different rectifying effects, i. e. the two rectifiers employed in the different receiving circuits act on different parts of the characteristic, as the charges at the grid of the receiving circuit for the oscillations to be received are different to those at the grid of the second receiving circuit for the interfering oscillations. It has also already been proposed to overcome this disadvantage by means of an additional oscillation generator (for example by means of a special local oscillator) acting on the second receiving circuit, which is tuned to a wave range adjacent to the wave to be received. It is the object of this additional local oscillator circuit to make the total amplitude of the oscillations to be rectified in the two receiving circuits equal to one another. In this way the same rectifying effect is obtained in both rectifying systems, so that an exact compensation is also rendered possible in the output circuit of the rectifiers.

This additional local oscillator circuit is, however, a disadvantage, as it represents an increased expenditure and it is also capable of picking up interfering oscillations, which prevent an exact compensation of the total connection system problematic. According to the invention, a circuit system is proposed, in which this additional local oscillator is avoided. In applicants' case two similar receiving systems are provided, each consisting of at least one electronic valve with

non-linear characteristic, and in accordance with the invention a D. C. coupling circuit is arranged between the grids of the valves, for example of the rectifiers. The output circuits of said receiving systems are connected as to operate in opposed phase. Thus, the disturbances are compensated.

Possible embodiments of the circuit system according to the invention are illustrated in Figs. 1 and 2. In both figures the same reference characters have been employed for similar elements of the connection, 1 being the aerial, from which the oscillations are conducted by means of the two coupling devices T_1 and T_2 having the coupling coils 2, 3 and 4, 5 to the two receiving circuits E_1 and E_2 having the rectifiers D_1 and D_2 . The receiving circuit E_1 is tuned by means of the condenser 6 to the oscillation to be received, and the second receiving circuit E_2 is tuned by the condenser 7 to a wavelength adjacent to the oscillation to be received. The condensers 8, 9 and the ohmic resistances 10 and 11 make the arrangement to form an ordinary grid-leak rectifier connection with the tubes D_1 and D_2 . The resistance 11 can also be omitted, or it must be large with relation to the resistances 12 and 13. Between the aerial circuit and the audion circuit there can naturally also be provided a simple or multiple high-frequency amplifier of desired kind. In the output circuit of the two rectifiers in Fig. 1 the oscillations are passed by way of the two low-frequency transformers t_1 and t_2 to the output circuit at the terminals a_1 and a_2 of which there can be tapped the signals received. In front of these terminals there can naturally also be provided a simple or multiple low-frequency amplifier. According to the invention, there is provided between the grids of the two rectifiers D_1 and D_2 , by way of the resistances 12 and 13, a D. C. coupling circuit which causes the two rectifiers to act on the same part of their characteristic, so that the rectified interferences which occur simultaneously and equally in the two receiving circuits, are of the same amplitude in the output circuit, and thus an accurate compensation of the interferences is ensured. At the same time there is provided between these two resistances 12 and 13 a connection by way of the condenser 14 to earth or to the cathode. This condenser 14 must be of such size that it is sufficiently large to withhold the low frequency of the rectifier D_1 from the rectifier D_2 , and at the same time it must be sufficiently small to avoid considerable delay.

According to the invention, therefore, a simple circuit system is set forth, in which an accurate compensation of the interferences is effected by simple means.

- 5 In Fig. 2 there is shown the same circuit system, only with the difference that it is simplified insofar as there are provided a common feed wire and a common anode circuit for both rectifiers D₁ and D₂.

10 I claim:

1. A radio receiving system adapted to eliminate the effects of static or other undesirable electrical disturbances comprising an aerial, two similar receiving systems, each consisting of at least one electronic valve with non-linear characteristic, including at least a plate, a grid and a cathode, two input and output circuits, and a direct current coupling circuit, said input circuits being both separately coupled to the aerial and both tuned to different adjacent wave lengths, said output circuits of both said receiving circuits being connected as to operate in opposed phase, said direct current coupling circuit including a pair of serially connected resistances interconnecting the grids of the electronic valves, and electronic storage means connected between the junction of said resistances and a point of fixed potential whereby the valves in each system will simultaneously operate with substantially the same characteristics.

2. A radio receiving system adapted to eliminate the effects of static or other undesirable electrical disturbances comprising an aerial, two similar receiving systems, each consisting of at least one electronic valve with non-linear characteristic, including at least a plate, a grid and

a cathode, two input and output circuits, and a direct current coupling circuit, said input circuits being both separately coupled to the aerial and both tuned to different adjacent wave lengths, said output circuits of both said receiving circuits being connected as to operate in opposed phase, said direct current coupling circuit being arranged between the grids of said valves, and including two resistances serially connected between said two input circuits, the common junction point of which is connected by means of a condenser to earth.

3. A radio receiving system adapted to eliminate the effects of static or other undesirable electrical disturbances comprising an aerial, two similar receiving systems, each consisting of at least one electronic valve with non-linear characteristic, including at least a plate, a grid and a cathode, two input and output circuits, and a direct current coupling circuit, said input circuits being both separately coupled to the aerial and both tuned to different adjacent wave lengths, said output circuits of both said receiving circuits being connected as to operate in opposed phase, said direct current coupling circuit being arranged between the grids of said valves, and including two resistances connected in series between said two input circuits, the common junction point of which is connected by means of a condenser to earth, said condenser having a value small enough to avoid too large electric time constant and large enough to withhold the low frequency of the one receiving circuit system from the other one.

HANNS-HEINZ WOLFF.