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SUPERHETERODYNE RECEIVING CIRCUIT

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Fig. 1

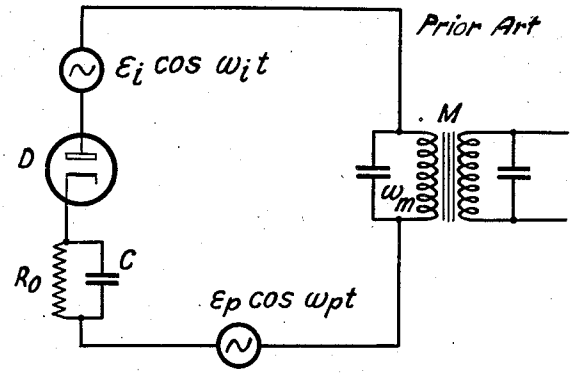
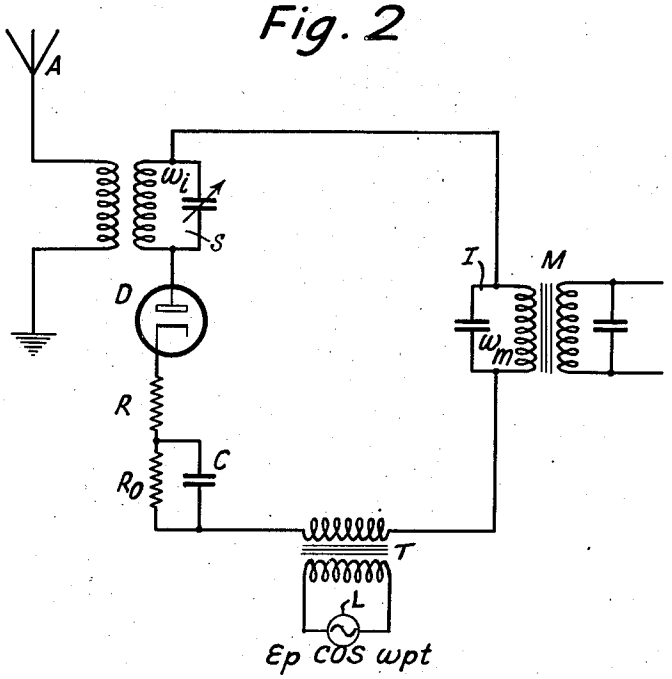


Fig. 2



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SUPERHETERODYNE RECEIVING CIRCUIT

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3 Claims. (Cl. 250—20)

Circuit arrangements for heterodyne reception are known, which utilise a diode as a mixing tube. In this case the diode is located in a closed circuit having an impedance, to which are supplied the incoming signals, a second impedance which has the oscillations of the oscillator supplied to it and a third impedance for the intermediate-frequency signal formed. In most cases this series-circuit includes, in addition, a resistance shunted by a smoothing condenser and serving to supply the diode with a certain biassing potential.

Such arrangements have various drawbacks. They are highly liable to modulation hum, cross modulation and howling tones, the latter especially in the case of incoming signals, whose frequency is simply related to, the intermediate frequency, for example the double of it.

The extent, to which these drawbacks will be experienced, depends on the shape of the diode characteristic curve, that is to say the steeper the curve the more appreciable they will be.

The present invention now consists in that the above-mentioned resistance is but partly bridged by a condenser.

On the one hand, this results in the diode characteristic being rendered less steep. On the other hand, the circuit shows the property of the three above-mentioned interfering phenomena being rendered smaller with an increase of the oscillator voltage, at least as long as this voltage is considerably larger than that of the incoming signal, which is, however, practically always the case.

By a choice of a suitably high oscillator voltage, it is thus possible to make the circuit to satisfy very high requirements as regards modulation hum, cross modulation and howling tones.

The invention will be more clearly understood by reference to the accompanying drawing, given by way of example, in which Fig. 1 shows a diagram of a known diode-mixing arrangement.

Fig. 2 shows one example of an improved arrangement according to the invention.

The arrangement according to Fig. 1 is constituted by a diode D in series with a resistance R_0, which is bridged by a smoothing condenser C. Further, there are series-connected a source of local oscillations $E_p \cos \omega_p t$, the primary winding of a tuned intermediate-frequency transformer M and a source of voltage $E_i \cos \omega_i t$ brought about by the incoming high-frequency signal.

The arrangement in Fig. 2 is substantially identical to that of Fig. 1, except that resistance R is not bridged. The incoming signal picked up by the antenna A is fed inductively to the tuned input circuit S having the frequency ω_i. The input circuit is connected on one side to the anode of the diode D and on the other side to a circuit I which is tuned to an intermediate frequency ω_m. The diode cathode has connected to it series-connected resistances R and R_0, only the latter being shunted by a condenser C. Local oscillations from source L of frequency $E_p \cos \omega_p t$ are applied through transformer T, the secondary of which is connected between resistance R_0 and the intermediate frequency circuit I.

Good results with this arrangement are obtained at the following values:

$R = 5000\Omega$
$R_0 = 0.1 m\Omega$ (megohms)
$C = 10^4 \mu f$.
$E_p = 25$ volts eff.
Internal resistance of diode: about 1000Ω

What we claim is:

1. In a mixing circuit, a diode rectifier, a resistance connected to the cathode of the rectifier, a condenser shunting only a portion of said resistance, and the series connection between the rectifier anode and said cathode resistance of a pair of tuned circuits and a local source of oscillations, one of the tuned circuits being resonant to the frequency of the incoming signal oscillations and the other of said circuits being resonant to an intermediate frequency resulting from mixing of the local oscillations with the signal oscillations.

2. In a mixing circuit, a diode rectifier, a pair of series-connected resistances connected to the cathode of the rectifier, a condenser shunting only one of said resistances, and the series connection between the rectifier anode and said cathode resistances of a pair of tuned circuits and a local source of oscillations, one of the tuned circuits being resonant to the frequency of the incoming signal oscillations and the other of said circuits being resonant to an intermediate frequency resulting from mixing of the local oscillations with the signal oscillations.

3. In a mixing circuit as defined in claim 2, wherein the value of one of the cathode resistances is several times the value of the other, and the condenser is shunted across the resistance of larger value.

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