

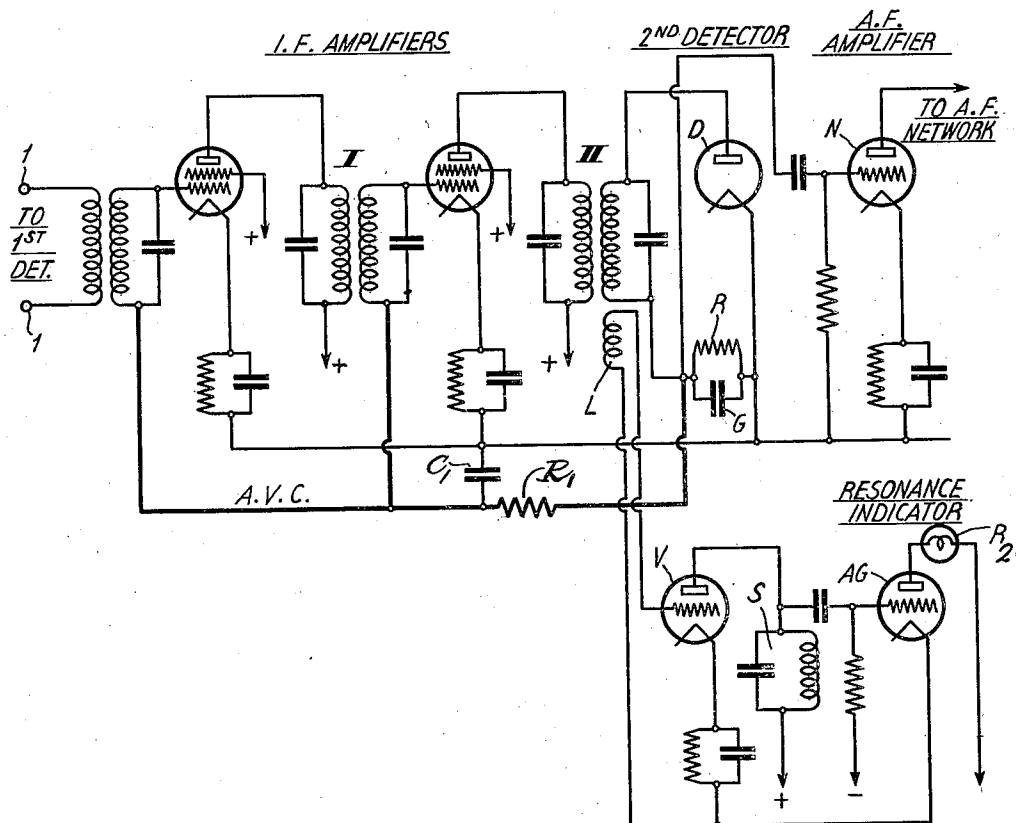
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RADIO RECEIVER TUNING INDICATOR

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RADIO RECEIVER TUNING INDICATOR

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1 Claim. (Cl. 250—20)

This invention relates to a circuit arrangement for so-called resonance indication in superheterodyne receiving sets.

As is well known, it is difficult to find the correct tuning point of a radio receiving set with automatic volume control, because the sound strength is almost independent of the tuning within definite limits. Consequently, the correct tuning cannot longer be found by adjusting to the greatest sound strength from hearing. This drawback can be avoided by means of so-called resonance indication, wherein a milliammeter, or the like, is inserted, for instance, in the anode circuit of a high or intermediate frequency amplifying tube, whose grid bias is acted upon by the automatic volume control device. Such resonance indication operates in a satisfactory manner only if the shape of the frequency characteristic of the high or intermediate frequency amplifier corresponds to that of a normal resonance curve. If, however, this frequency characteristic has an almost rectangular shape, as is required in view of the quality of reproduction, such resonance indication is no longer possible.

The present invention has for its object a circuit arrangement by means of which resonance indication is achieved in superheterodyne receiving sets having a substantially rectangular frequency characteristic. According to the invention this is achieved by coupling one, or more, weakly damped resonance circuits with the intermediate frequency amplifier. These circuits are connected to an electron discharge tube such as a rectifying tube, in whose direct current circuit is inserted an incandescent lamp, a glow lamp, an indicating device or the like.

The invention will be more clearly understood by reference to the accompanying drawing representing, by way of example, one embodiment thereof.

As is shown in the drawing the succeeding stages of a two-stage intermediate frequency amplifier are coupled with the I. F. input terminals I, I by means of band filters I and II consisting of inductively coupled tuned oscillatory circuits. The amplified intermediate frequency oscillations transmitted through the secondary circuit of the band filter II are rectified with the aid of a diode D, so that a direct voltage drop and a low frequency alternating voltage in accordance with the modulation of the intermediate frequency are set up at a resistance R bridged by a condenser G, said alternating voltage being supplied in the usual way to a low frequency amplifying tube. The direct voltage drop at the resistance R serves for controlling the amplification of the intermediate frequency amplifying tubes, and for this purpose the grid circuits of

these tubes are connected to the end of the resistance R remote from the cathode of the rectifying tube through a filter consisting of the resistance R_1 and the condenser C_1 . A coil L inserted in the grid circuit of an amplifying tube V is coupled with the band filter II, which like the band filter I has also a substantially rectangular resonance curve. The anode circuit of the tube V comprises a weakly damped oscillatory circuit S which is tuned to the intermediate frequency. That is to say, the weakly damped circuit is sharply tuned to the mid-band frequency of the networks I and II. The alternating voltage set up through this oscillatory circuit S is rectified by a tube AG which operates as an anode rectifier. Furthermore, an incandescent lamp R_2 for resonance indication is interposed in the anode circuit of the tube AG.

The operation of this arrangement will be readily understood, since a sufficiently high voltage will be set up at the oscillatory circuit S only if the receiver part preceding the intermediate amplifier be correctly tuned, so that the incandescent lamp R will brightly light only in the case of correct tuning. In the arrangement referred to above the tube AG operates as a rectifier. However, this is not necessary, since said tube may also operate as an amplifier, in which case the incandescent lamp R is fed with the intermediate frequency.

What I claim is:

In a superheterodyne receiver including at least a pair of intermediate frequency amplifier tubes coupled by a bandpass network, a demodulator coupled to the second tube by a bandpass network, each of said networks having a substantially rectangular resonance wave characteristic, the networks being tuned to the operating intermediate frequency, automatic volume control means connected between said demodulator and said tubes, a weakly damped resonant circuit which is normally independent of said networks but is sharply tuned to the mid-band frequency of said networks, means for coupling the resonant circuit to the second of said bandpass networks, a rectifier coupled solely to said sharply tuned circuit and producing a rectified voltage which is dependent only upon the intermediate frequency energy transferred to said sharply tuned circuit from said second network, and a visual current indicator, coupled solely to the rectifier, for indicating the resonance condition of the receiver, and said volume control means being constructed and arranged to vary the gain of said amplifier tubes in response to receive signal amplitude variations.

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