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SELECTIVE CIRCUIT ARRANGEMENT

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Fig. 1

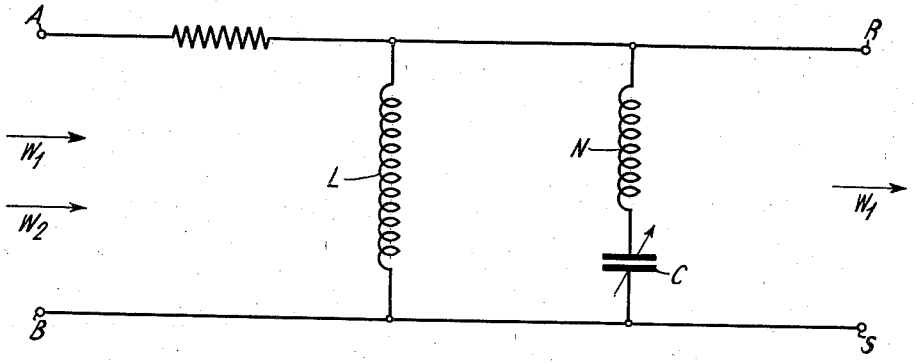


Fig. 2

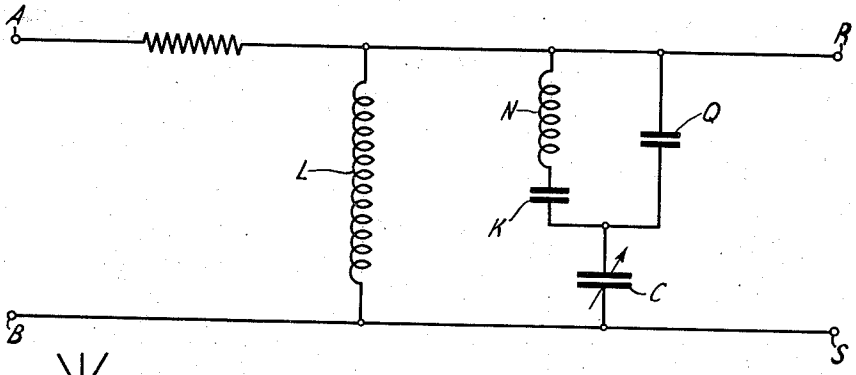
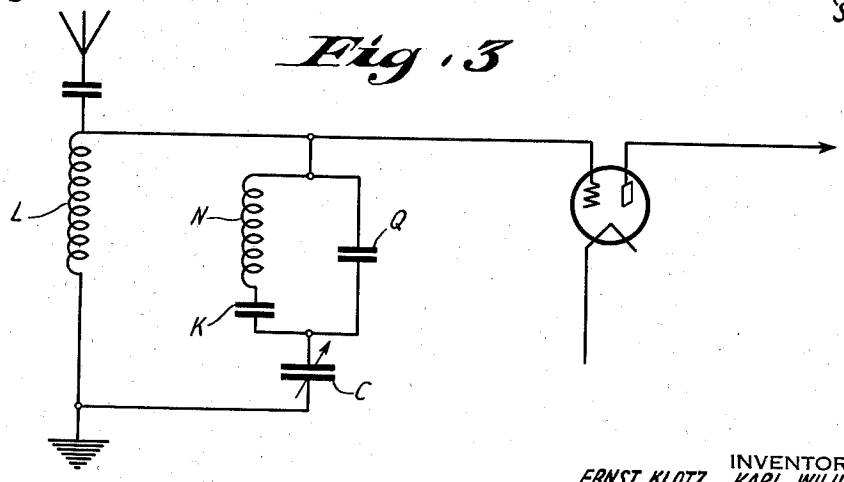


Fig. 3



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SELECTIVE CIRCUIT ARRANGEMENT

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4 Claims. (Cl. 250—20)

This invention relates to circuit arrangements adapted simultaneously to insure current and voltage resonance. In the radio receiver and transmitter arts it is quite frequently desirable to provide circuit arrangements which possess current and voltage resonance within a desired frequency range, and which are so arranged that the frequency difference between the two resonance points remains approximately constant as the resonance frequency is varied over the range. The invention is concerned with a novel and especially simple embodiment of such circuit organizations.

The invention is illustrated in the accompanying drawing, in which:—

Fig. 1 shows a customary form of construction,

Fig. 2 shows how the invention may be applied thereto, and

Fig. 3 illustrates the application of the invention to a radio receiving circuit.

In Fig. 1, alternating current energy is fed in at the terminals A and B, while the energy output end is across the terminals R and S. The arrangement has a current resonance point at a frequency governed by the formula $\omega_1^2(L+N)C=1$, whereas across the points R and S there exists a voltage resonance for a frequency satisfying the formula $\omega_2^2NC=1$.

A disposition of this sort is used in all instances where a desired frequency ω_1 is to be transmitted across terminals A, B, to the terminals R, S, with as little dissipation as possible, while an undesired frequency ω_2 fed in at the terminals A and B, or terminals R and S, will be attenuated as much as feasible at the respective other end. On changing the tuning of this structure by variation of the capacity C it is found that the distance between ω_1 and ω_2 in terms of frequency will not remain constant.

Now, in order that this distance or difference in frequency may be stabilized, a further capacity of a definite size is connected in parallel relation to the inductance N. The improvement thereby obtainable is, however, inadequate in a number of practical cases, especially when relatively large frequency ranges are dealt with. A far better frequency characteristic is obtained if the arrangement is designed in the form of an oscillation circuit in that, as shown in Fig. 2, a capacity K is provided in series with the inductance N. The capacity Q is in parallel with the series connection of inductance N and capacity K.

For a frequency range of 1:3, the capacities K and Q may suitably be proportioned as follows:

$$K=25Q$$

whereas the capacity K must be so dimensioned that the frequency

$$\omega=\frac{1}{\sqrt{NK}}$$

and frequency

$$\frac{1}{\sqrt{NQ}}$$

have the same geometric mean as the frequencies

$$\frac{1}{\sqrt{LC_{max}}}$$

and

$$\frac{1}{\sqrt{LC_{min}}}$$

Fig. 3 shows how the invention may be applied to a radio receiving circuit.

In said Figure 3 an antenna is connected to the upper end of the coil L through a condenser, the lower end of the coil being grounded as shown. The remaining portion of the circuit is like that shown in Figure 2 in that the combination of a variable condenser, a relatively large fixed condenser and a shunt inductance coil, the latter two elements being shunted by a relatively small fixed condenser, is shunted across the coil L. The utilizing device in the case of Figure 3 comprises a thermionic tube, the input of which is connected to the network previously described.

We claim:

1. A filter circuit for radio frequency currents comprising a pair of output terminals, a connection conductive to direct current between said terminals and including an inductance coil, a circuit connecting said terminals and including the series connection of a fixed and a variable condenser, and the series connection of a coil and a condenser shunted across the terminals of said fixed condenser.

2. The combination defined in the preceding claim in which the capacity of the condenser in series with the coil is at least ten times the capacity of said fixed condenser.

3. In a circuit arrangement of the kind described, a network having a pair of input terminals for connecting the network to a source of signalling energy and a pair of output terminals for connection of the network to a utilizing device, said network comprising an inductance coil shunted by the combination of a variable con-

denser, a relatively large fixed condenser and a second inductance all in series, and a relatively small fixed condenser in shunt relationship to the second inductance, said variable condenser being adapted to tune the network as a whole to any desired frequency within a band of signalling frequencies, said fixed condensers and second inductance having such values as to make said combination series resonant at a frequency higher by a substantially constant predetermined amount throughout the tuning range than the frequency to which the network as a whole is tuned to by operation of the variable condenser.

4. In a circuit arrangement of the kind described, a network provided with a pair of input terminals for connecting the network to a source of signalling energy and a pair of output terminals for connecting the network to a utilizing device, said network comprising an inductance coil shunted by the combination of a variable condenser, a relatively large fixed condenser and a second inductance all in series and a relatively small fixed condenser in shunt relationship to the relatively large fixed condenser and second inductance, said variable condenser being adapted to tune the network as a whole to any desired frequency of a range of signalling frequencies, said fixed condensers and second inductance having such values with respect to each other and to the variable condenser as to make said combination series resonant at a substantially constant frequency difference throughout the range of frequencies than the frequency to which the network as a whole is tuned by operation of the variable condenser.

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