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H. O. PETERSON

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MULTIRANGE RADIO FREQUENCY CIRCUIT

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Fig. 1

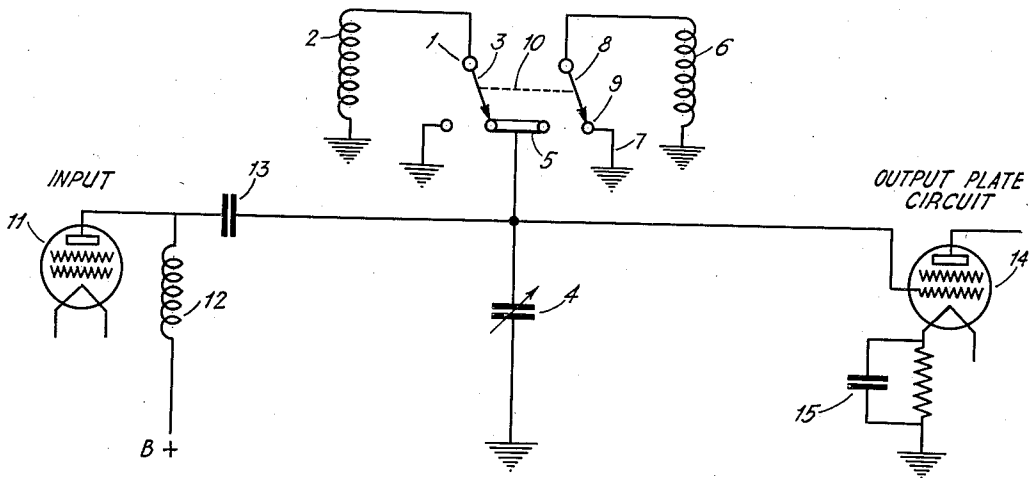
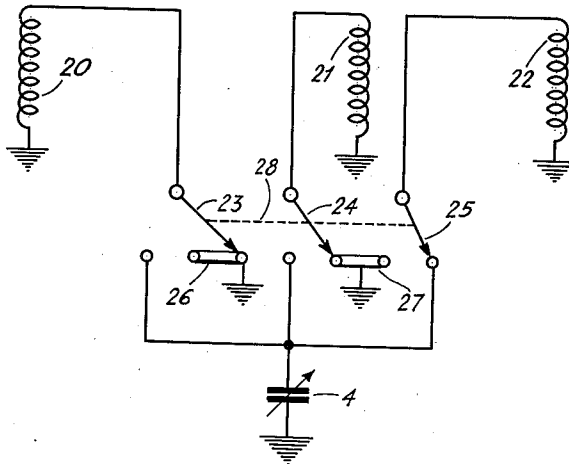


Fig. 2



INVENTOR
HAROLD O. PETERSON
BY *H. S. Grover*
ATTORNEY

UNITED STATES PATENT OFFICE

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MULTIRANGE RADIO FREQUENCY CIRCUIT

Harold O. Peterson, Riverhead, N. Y., assignor to
Radio Corporation of America, a corporation of
Delaware

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6 Claims. (Cl. 250—40)

This invention relates to means for efficiently operating radio frequency devices employing multi-range tuned circuits.

An object of this invention is to simplify and improve radio frequency devices generally, and more particularly the general circuit and switching arrangements as employed in radio frequency amplifiers, transmitters, receivers, oscillators and the like.

The most common method employed in the past for changing the range of a tuned radio circuit has been by the employment of plug-in coils, each separate plug-in coil having a different number of conductor turns to give the various values of inductances. The use of such plug-in coils requires the most careful handling so as to prevent damage to the coil form and the misplacement of the conductor turns, which is likely to result in a change in the inductance and capacity values between turns of the coil which will seriously affect the tuning when such coil is placed in the multi-range tuned circuit. Furthermore, such coils require that they be stored in a safe and convenient place to prevent their loss. The more desirable method is to place the coils having various values of inductances in the same housing as the receiver, making the proper change from one value of coil inductance to another by means of suitable switching devices. However, when inductance coils are employed in a multi-range tuned circuit and placed within the same receiver housing with a switching arrangement as well-known in the prior art, it is very likely that the multi-range tuned circuit will have undesirable capacitance and inductance values, for the reason that the coils not selected for use may have free resonant characteristics which will introduce serious losses in the circuit used at that particular resonant frequency.

It is an object and purpose of my invention to overcome the above objections and difficulties by an improved switch and circuit arrangement in which the coils can be conveniently located within the same housing as the other circuit devices, and by means of the switch both ends of the inductance coil or coils are grounded when it is not desired that they be in use.

My invention may best be understood by referring to the accompanying drawing in which,

Fig. 1 shows a circuit switching arrangement for two inductance coils each of different inductance values; and

Fig. 2 shows a circuit switching arrangement

for three inductance coils each of different inductance values.

Referring now to Fig. 1 of the drawing, it will be seen that the high side 1 of coil 2 which is shown to be the one of a desired value forms a tuned circuit and is capacity loaded by a variable capacitor 4 by being connected by a switch arm 3 which makes contact with a common contact element 5. The coil 6 shown not desired to be in use and having a different inductance value than the coil 2, is prevented from having a natural resonance by grounding the coil 6 at 7 by means of a second switch arm 8 which connects to a grounded contact 9. The switch arm 8 which is associated with and operates simultaneously with the switch arm 3 is spaced by an insulated member 10 at a sufficient distance from arm 3 so as not to excessively load the tuned circuit with any dead capacity.

Other well-known parts of the circuit are the input tube 11, radio frequency choke 12, blocking condenser 13, output tube 14, and by-pass condenser 15. This is a typical amplifier circuit in which relatively high impedance is obtained at a desired frequency by tuning a parallel resonance circuit to that frequency.

Fig. 2 shows a modification wherein three tuned coils 20, 21 and 22 are arranged with a switch having three movable arms 23, 24 and 25. The inductance coils 20 and 21 each have a different inductance value than coil 22 and are grounded at their high potential end by the common grounded contacts 26 and 27. The movable arms 23, 24 and 25 are operated simultaneously by the insulated member 28, all other parts of the circuit being similar to that as described in Fig. 1.

It is to be understood that this invention is capable of other modifications except as may be limited by the appended claims.

I claim:

1. A radio frequency amplifier circuit having means for selecting different inductance coils comprising a pair of thermionic tubes, a tunable circuit connected to an output electrode of one tube and an input electrode of another, means for tuning said circuit comprising a plurality of inductance coils each coil having a different inductance value, a connection between one side of each of said inductance coils and ground, switching means for selecting one of said coils, said means comprising contacts for operatively connecting the ungrounded side of the selected inductance coil to said thermionic tubes and also

connecting to ground the ungrounded side of the unselected inductance coil.

2. A multi-range radio frequency system comprising an inductance circuit having two inductance coils, each of said coils being of a different inductance value, circuit switching means for selecting either one of said coils having a desired inductance value, a tuned circuit comprising one of said inductance coils and a variable capacitor, one side of both of said coils and one side of said variable capacitor being connected to ground, said switching means comprising a switch having movable arms, a common contact connected to the ungrounded side of said variable capacitor for connection to the ungrounded side of either one of the coils desired to be used in said tuned circuit including said variable capacitor, and separate contacts for grounding the ungrounded side of the undesired inductance coil, said movable arms arranged to simultaneously connect the desired inductance coil to said common contact and the otherwise ungrounded end of the coil not desired to be used to ground.

3. A multi-range radio frequency circuit comprising input and output circuits, an inductance circuit having a plurality of inductance coils each having a differing inductance value, one side of each coil being grounded, the other side of said coils being connected to circuit switching means for selecting any one of said coils having a desired inductance value, a tuned circuit comprising the selected inductance coil and a variable capacitor, said circuit switching means arranged with a plurality of switch arms and contacts for switching in place only the desired inductance coil and grounding the ungrounded sides of all inductance coils not desired to be used in said tuned circuit.

4. A multi-range radio frequency circuit comprising input and output circuits, an inductance circuit having two inductance coils each of a different inductance value, circuit switching means for selecting one of said inductance coils, a tuned circuit comprising the selected inductance coil and a variable capacitor, one side of each inductance coil and said variable capacitor being permanently connected to ground, said circuit switching means comprising a switch having two mov-

able arms, a common contact connected to the ungrounded side of said variable capacitor for connecting the ungrounded side of the selected coil to said variable capacitor, and a separate contact cooperating with said movable arms for grounding the side of the coil not permanently grounded of the coil not selected for use in said tuned circuit.

5. A multi-range radio frequency circuit comprising input and output circuits, an inductance circuit having three inductance coils each of a different inductance value, and circuit switching means for selecting any one of said inductance coils, a tuned circuit comprising the selected one of said inductance coils and a variable capacitor, one side of each inductance coil and said variable capacitor permanently connected to ground, said circuit switching means comprising a switch having three movable arms, two common contacts each connected to ground for grounding each side of each coil not permanently grounded of two of said coils which are not selected for use in said tuned circuit, and a separate contact for each coil co-operating with said movable arms for connecting the ungrounded side of the selected coil in the circuit containing the variable capacitor.

6. A multi-range radio frequency circuit comprising input and output circuits, an inductance circuit having a plurality of inductance coils each of a different inductance value, and circuit switching means for selecting any one of said inductance coils, a tuned circuit comprising the selected one of said inductance coils and a variable capacitor, one side of each inductance coil and said variable capacitor permanently connected to ground, said circuit switching means comprising a switch having a plurality of movable arms, a plurality of common contacts each connected to ground for grounding each side of each coil not permanently grounded of each of said coils which are not selected for use in said tuned circuit, and a separate contact for each coil cooperating with said movable arms for connecting the ungrounded side of the selected coil in the circuit containing the variable capacitor.

HAROLD O. PETERSON.