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WAVE RANGE SWITCHING MECHANISM

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Fig. 1.

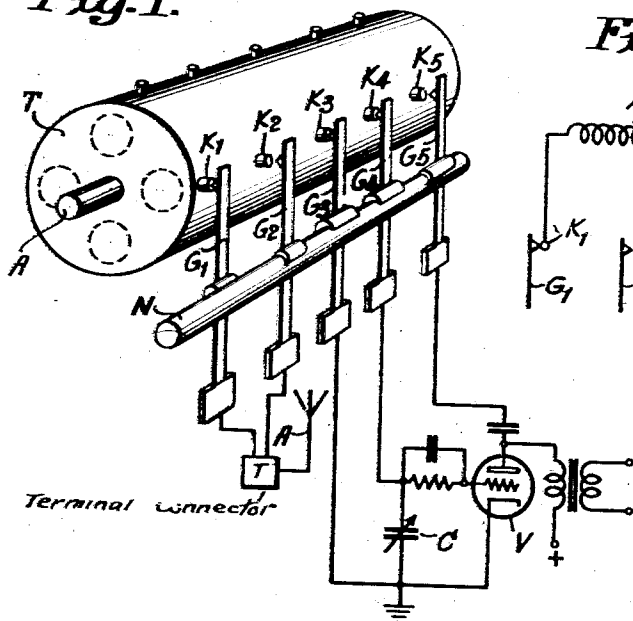


Fig. 1a.

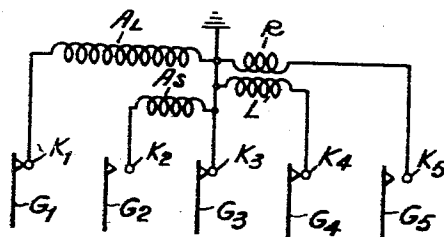


Fig. 2.

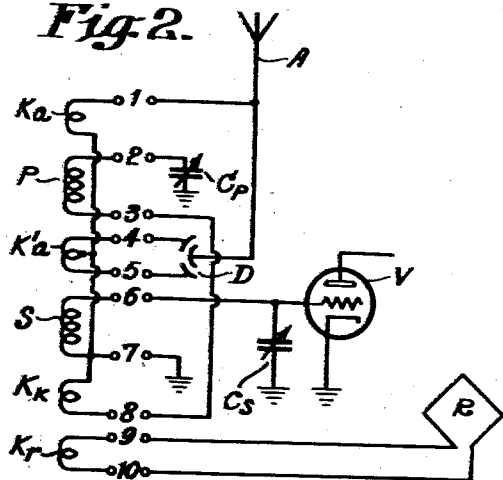


Fig. 2b.

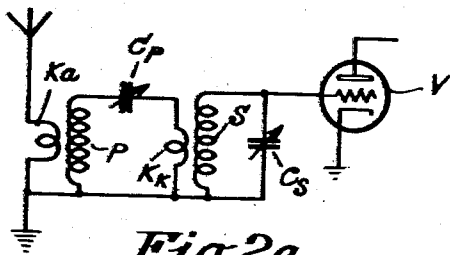
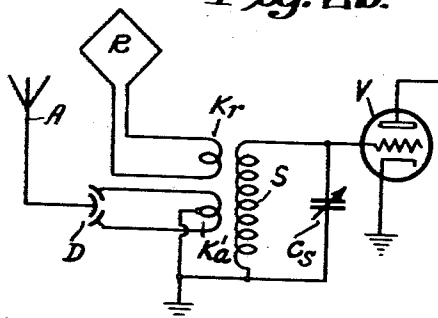


Fig. 2a.

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WAVE RANGE SWITCHING MECHANISM

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In high frequency apparatus it is already known to employ wave range switching mechanism whereby the coil sets for the various wave ranges are arranged on a rotatable drum. Each coil set is connected to a respective set of contact poles provided on the drum. The sets of contact poles can be placed as desired at a single set of fixed contact poles by turning the drum.

In such apparatus, aside from the wave range switching, a still other switching of the high frequency coils, or intermediate frequency coils, is desired such that in each individual wave range it is possible to select at will the one, or another operating mode. Thus, in the case of a receiver it may be desirable, for instance when passing from the reception of a nearby transmitter to the reception of a distant transmitter, to connect in place of a large antenna coupling coil, a smaller coil, or in place of a smaller feed back coil, a larger coil.

At the present in order to accomplish this purpose additional contacts must be provided which are inserted for instance into the connection line between the respective fixed contact poles of the drum switch and the antenna. The antenna current must hereby be passed across two contacts before reaching the antenna coupling coil of the respectively inserted wave range.

In accordance with the present invention the requirement of additional contacts is excluded in that the fixed set of contact poles of the drum is controlled by a cam roller in a manner such that according to the position of the cam roller only those contacts of the drum switch are closed which are desired for the desired state of operation; hence, only those coils of the set of coils, which are inserted by the wave range switch, are active which are required for the respective operating state.

Examples of construction according to the present invention are shown schematically in Figs. 1 and 2. Fig. 1a shows the connections of one set of coils within the drum of Fig. 1, and Figs. 2a and 2b are the circuit connections resulting from the switching operations described in reference to Fig. 2.

Fig. 1 represents a simple receiver having a coil drum for four different wave ranges. The drum T which is mounted rotatably about the shaft A carries in its interior four sets of coils (indicated in broken lines), each set comprising four coils, indicated diagrammatically in Fig. 1a, whereby two serve as antenna coupling coils which can be switched-in selectively, one serving

as the coil of the oscillatory circuit, and another as the feed-back coil. The drum carries on the outside four sets of contact poles each of which consisting of five poles whereby the one set K₁, K₂, K₃, K₄ and K₅ is arranged directly opposite the yielding counter contacts G₁, G₂, G₃, G₄ and G₅. By means of a cam roller N in the position herein shown the counter springs G₁, G₃ and G₄ are forced against the appertaining contact poles K₁, K₃, and K₄ of the drum switch, while in a position displaced by 120° the contacts G₂—K₂, G₃—K₃, G₄—K₄, G₅—K₅ are closed and the contacts G₁—K₁ are open.

In the position shown the larger antenna coupling coil (A_L in Fig. 1a) is connected with the antenna A by way of the contacts K₁—G₁ and antenna terminal connector T. The coil (L in Fig. 1a) of the oscillatory circuit is shunted by way of the contacts G₃—K₃ and G₄—K₄ across the condenser C of the grid circuit, while the coil (R in Fig. 1a) provided for the feed back is inactive since the contacts G₅—K₅ are open. This switching state is especially suited for receiving a nearby transmitter.

In the other switching position which corresponds with the reception of a more distant transmitter, the smaller antenna coupling coil (as in Fig. 1a) is connected with the antenna by way of the contacts K₂—G₂ and antenna terminal connector T and at the same time the feed-back coil (R in Fig. 1a) is connected capacitively to the anode of the tube V by way of the contacts K₅—G₅. The coil L of the oscillatory circuit remains switched-in by way of the contacts K₃—G₃ and K₄—G₄. The return leads of the antenna coupling coil and of the feed-back coil are grounded by way of the contacts K₃—G₃.

The invention can be applied to particular advantage in the case of airplane receivers which can be switched at will to different operating modes such as for instance broadcast reception, homing indication, direction finding, determination of the sides. A circuit which is suited to this end is shown in Fig. 2. In this figure there is indicated only a single set of coils carried by the drum, namely the coil set serving for a single wave range. The set of coils consists of the antenna coupling coil K_a, the primary coil P, the secondary coil S and the coupling coil K_k which couples the primary circuit with the secondary circuit. In addition a differential antenna coupling coil K'_a and a frame coupling coil K_r are provided. For the broadcast recep-

tion the contacts 1, 2, 3, 6, 7 and 8 are closed, while the contacts 4, 5, 9 and 10 are open. As shown in Fig. 2a the linear antenna A is thus coupled across the coupling coil K_a with the primary coil P which in turn lies together with its series coupling coil K_s in parallel to the primary tuning condenser C_p . The secondary coil S lies in parallel to the tuning condenser C_s and thus at the grid of the input tube V. When switching to direction finding the contacts 1, 2, 3 and 8 are opened, while the contacts 4, 5, 9 and 10 are closed. The contacts 6 and 7 remain closed. In this way, as shown in Fig. 2b, the antenna A is coupled across the differential condenser D and the coupling coil K'_a with the coil S of the oscillatory circuit. Together with the latter also the direction finder frame R is coupled across the coupling coil K_r .

Just as in the arrangement according to Figure 1, the switching of the contacts take place by means of a cam roller which controls the ten stationary contact springs of the coil drum in a corresponding manner. For switching the wave range the drum is turned whereby a second coil set is switched-in accordingly.

The present invention may also be applied to drum-type switches of a different sort, for instance in the case of a drum carrying several sets of condensers for the various wave ranges.

What we claim is:

1. In radio apparatus, wave-change switching mechanism comprising a rotary drum provided with a plurality of sets of coils, each set including a plurality of coils terminating in contacts on the drum, spring contacts arranged to be successively associated with and to be normally in contact with the coil contacts of each set, and a cam shaft cooperating with said spring contacts to selectively break only predetermined ones of said contacts.

2. In radio apparatus, an antenna circuit and at least one oscillatory circuit, wave-change switching mechanism comprising a rotary drum provided with a plurality of sets of coils, each set including a plurality of antenna coils and a plurality of coils for the oscillatory circuit, spring contacts associated with the coil terminals, and a cam shaft cooperating with said spring contacts to selectively make or break predetermined ones of said contacts.

3. In radio apparatus, an antenna circuit and

at least one oscillatory circuit, wave-change switching mechanism comprising a rotary drum provided with a plurality of sets of coils, each set including large and small antenna coils, a coil for the oscillatory circuit, and a feed-back coil, said coils terminating in contacts on the drum, spring contacts arranged to be successively associated with the coil contacts of each set, and a cam shaft cooperating with said spring contacts to selectively close certain of the contacts to include in circuit the large antenna coil and the oscillatory circuit coil or to close certain other of said contacts to include in circuit the small antenna coil, the oscillatory circuit coil and the feed-back coil.

4. In radio apparatus, a directional antenna and a non-directional antenna, coupling coils for said antennae, an oscillatory circuit, said coils terminating in fixed contacts, spring contacts associated with the coil terminals, and a cam shaft cooperating with said spring contacts to selectively close certain of the contacts to couple only the non-directional antenna to the oscillatory circuit or to close certain other of said contacts to couple both the directional and non-directional antennae to the oscillatory circuit.

5. In radio apparatus, wave-change switching mechanism comprising a rotary drum provided with a plurality of sets of coils, each set including a plurality of coils which terminate in contacts on the drum, spring contacts respectively associated with the coil contacts, a directional antenna connected to certain of the spring contacts, a non-directional antenna connected to other spring contacts, a tuning condenser connected to still other spring contacts, and a cam shaft coacting with the spring contacts so constructed and arranged that in one position of adjustment said shaft is adapted to close certain of the spring contacts whereby the tuning condenser is connected across one of the coils to constitute a tuned circuit and both antennae are connected to their respective coils and coupled to said tuned circuit, and in a second position of adjustment said cam shaft is adapted to close certain other of said spring contacts whereby only the non-directional antenna is coupled to the tuned circuit.

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