May 5, 1936. C. L. CHUNN 2,039,885

SINGLE DIAL ALL WAVE RECEIVER

Filed Aug. 14, 1935

Fig. 1.

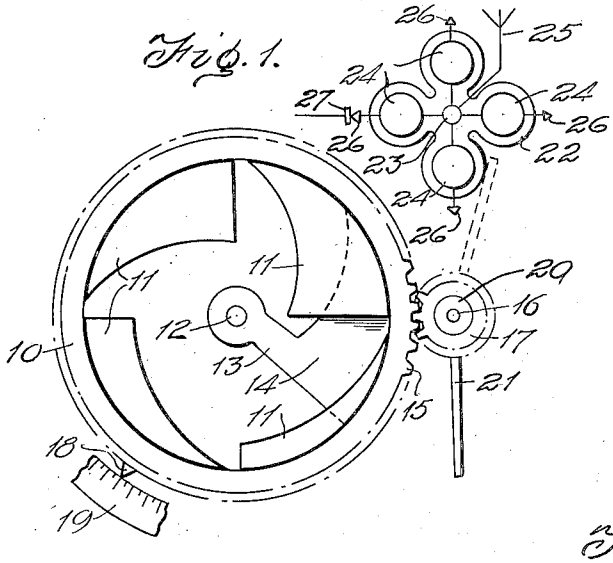


Fig. 2.

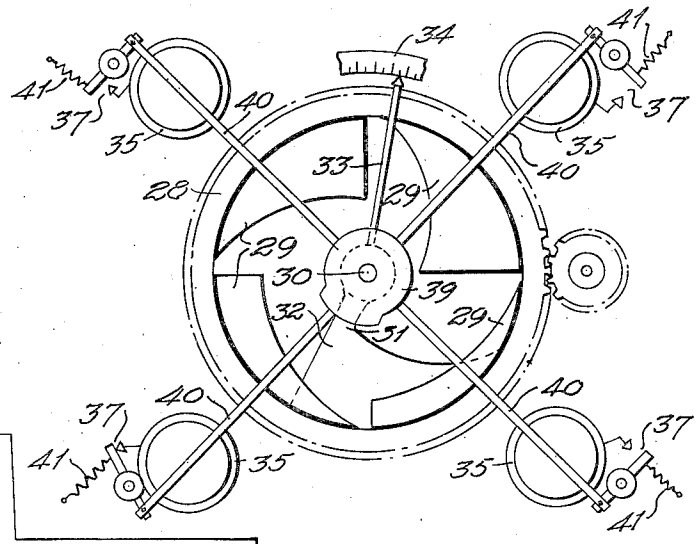
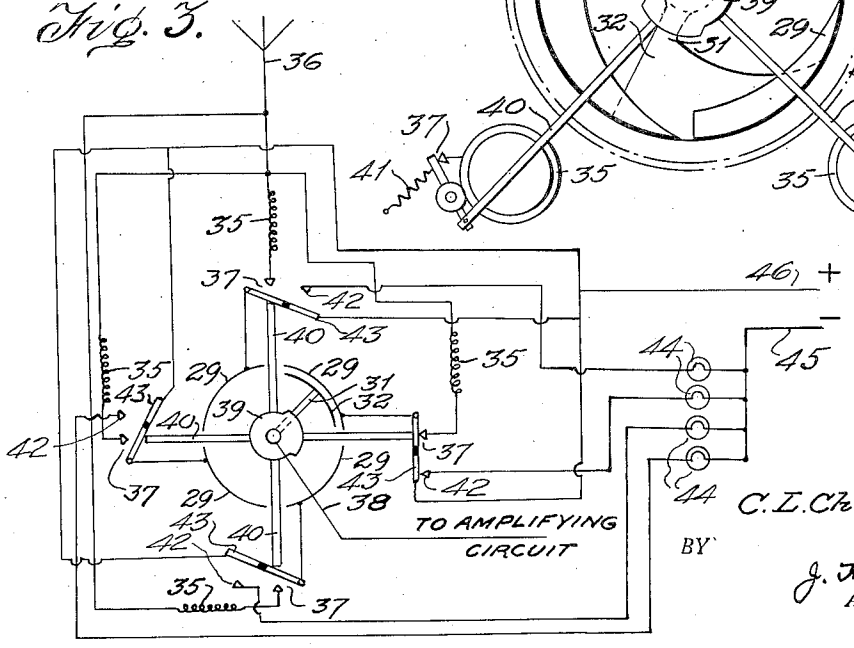


Fig. 3.



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SINGLE DIAL ALL WAVE RECEIVER

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10 Claims. (Cl. 250—40)

The invention relates to radio receiving apparatus and has special reference to a single dial all wave receiver.

It is a well recognized fact that it is necessary that receiving sets should be arranged with different circuits for effective reception of the several groups of wave bands such for instance as the group known as short waves, that of the broadcasting bands and that of the commercial bands. In receiving sets intended to cover two or more groups of the wave bands it has been customary to provide several circuits each having a separate dial arrangement and means to shift the operation from one circuit and dial to another.

These circuits usually differ from each other by differences in the capacities of the tuning condensers and in the characteristics of the load coils employed in the antenna circuits so that arrangements are commonly to utilize the same amplification circuits in connection with different load coils and condensers by selectively connecting the several tuning condensers and their associated coils in the general circuit, each tuning condenser having its own dial.

The principal object of the present invention is to provide an improved radio receiving set wherein the operation of a single dial will effect tuning for all wave lengths desired to be covered by the set.

A second important object of the invention is to provide novel means whereby, as the dial is rotated from a segment covering one group of wave lengths to a segment covering another group of wave lengths the proper condenser and coil will be automatically connected in the circuit of the receiving set.

A third important object of the invention is to provide a novel construction of apparatus of this character whereby rotation of the dial for tuning automatically operates switches for connecting and disconnecting the several circuit arrangements.

A fourth important object of the invention is to provide a novel arrangement of pilot lights each associated with a respective condenser and load coil and so arranged that the light associated with such condenser and coil will be energized when the condenser and coil are in circuit.

With the above and other objects in view the invention consists in general of certain novel details of construction and combinations of parts hereinafter fully described, illustrated in the accompanying drawing and specifically pointed out in the claims.

In the accompanying drawing like characters of reference indicate like parts in the several views, and:—

Figure 1 is an elevation of that part of a radio receiving apparatus which embodies the invention, the invention being shown in a partially diagrammatic manner and embodying one form of the improvement, the view being broken away in part.

Figure 2 is a view similar to Figure 1 but disclosing a second embodiment of the invention.

Figure 3 is a wiring diagram illustrating the principles involved in this invention.

In the form of the invention shown in Figure 1 there is provided a rotatable ring 10 on the inner side on which is insulatedly mounted a series of equally spaced condenser plates 11 so proportioned and graduated in size as to provide different maximum capacities. A post 12 is fixed centrally of this ring 10 and on the post is fixed an arm 13 carrying fixed condenser plates one of which is shown at 14 as representing the usual set of such plates. The plates 11 and 14 are taperingly shaped in the usual manner and the plates 14 conform in shape and size to the plates 11 having maximum capacity. Also the plates 11 and 14 are spaced in the usual manner so that each set of plates 11 may, upon rotation of the ring 10 pass between the plates 14. By this means there is provided a series of variable condensers which are successively formed by rotation of the ring 10.

The ring 10 is provided with external teeth 15 so that it forms a gear ring. A shaft 16 is provided with a pinion 17 fixed on the shaft to revolve therewith and this shaft forms the tuning shaft of the set, the ring 10 being provided with a pointer 18 traversing a graduated dial 19 here shown in the form of a ring. It is obvious that the dial and pointer or index may be reversed in position so that the dial rotates with the ring 10 and the pointer or index is fixed. This is a common and well known arrangement and it is not deemed necessary to show the same. Also the shaft is provided with the usual operating knob 20. The shaft 16 has an arm 21 extending radially therefrom and with each revolution of the shaft 16 this arm engages a gear 22 revolubly mounted on a shaft 23. The gear 22 has teeth equal in number to the number of sets of plates 11 and the gear of the ring 10 is so proportioned to the gear 17 that the latter must rotate as many times as there are sets of plates 11 to effect one rotation of the ring. Thus, as here shown there are four sets of plates 11 and accordingly there are

four teeth on the gear 22 and the gear 17 is one-fourth the diameter of the ring gear. On the gear 22 are mounted load coils 24 equal in number to the sets of plates 11 and these coils are connected in multiple to the antenna 25. Also each coil has a terminal contact 26 which is adapted to engage a fixed contact 27 so that rotation of the tuning shaft brings these coils successively into circuit.

In the form of the invention shown in Figure 2 there is provided a ring 28 which carries on its interior a series of sets of condenser plates 29 similar to the condenser plates 11. Centrally of the ring 28 is a rotatable shaft 30 forming the tuning shaft and provided with suitable means (not shown) to enable it to be rotated. On the shaft 30 is fixed an arm 31 carrying a set of condenser plates 32 corresponding to the condenser plates 14 of the previously described form. Also the shaft 30 carries a pointer 33 traversing a graduated dial ring 34. Around the ring 28 are fixed the load coils 35 corresponding in number to the sets of plates 29, these coils being (see Fig. 3) connected in multiple to the antenna 36 and each being connected to one member of a respective switch 37 while the other member of the switch is connected to the proper set of condenser plates 29. A conductive connection 38 leads from the condenser plates 32 to the usual amplifying circuit (not shown).

In order to operate the switches a cam 39 is fixed on the shaft 30 and engages the inner ends of slidable push bars 40 which have their outer ends connected to the movable members of the respective switches 37 which are normally held open by springs 41.

With this arrangement the load coils and the corresponding fixed condenser plates are successively connected to the antenna in series as the pointer is moved through successive segments of the dial.

Moreover, as shown in Figure 3 each switch 37 has associated therewith a fixed contact 42 and a movable contact 43 which closes on the fixed contact upon the respective switch 37 being closed. Each contact 42 is connected in series to a pilot light 44 and these pilot lights are connected in multiple to a lead 45. Also the contacts 43 are connected in multiple to a lead 46. The leads 45 and 46 carry current at a suitable voltage for the lamps 44. By this means as each switch is closed to bring the condenser and load coil which it controls into circuit, a circuit is also closed through a respective lamp 44. The lamps thus form indicators to show which set of wave bands are in circuit for use.

There has thus been provided a simple and efficient device of the kind described and for the purpose specified.

It is obvious that changes may be made in the form and arrangement of the parts without departing from the material principles of the invention. It is not therefore desired to confine the invention to the exact form herein shown and described but it is desired to include all such as come within the scope claimed.

What is claimed, is:

1. In radio receiving apparatus, a pair of relatively rotatable members comprising a shaft and a ring, one of which is fixed and the other movable, a series of sets of condenser plates arranged around and carried by the ring, a single set of condenser plates carried by the shaft and arranged for selective cooperation with the first sets of condenser plates, an antenna, a series of load coils connected in multiple to said antenna and each connectable to a respective set of condenser plates of the series of sets, a lead connected to the single set of plates whereby said single set of plates may be connected to an amplifying circuit, and switch means operatively associated with the movable member and arranged to connect the cooperating set of plates of the series of sets and the load coil associated therewith in series between the antenna and single set of plates, said switch means including a cam carried by the movable member and a series of switches operated successively by the rotation of said cam and each controlling the circuit through a respective load coil.

2. In radio receiving apparatus, a pair of relatively rotatable members comprising a shaft and a ring, one of which is fixed and the other movable, a series of sets of condenser plates arranged around and carried by the ring, a single set of condenser plates carried by the shaft and arranged for selective cooperation with the first sets of condenser plates, the several sets of the series of plates having different capacities, an antenna, a series of load coils connected in multiple to said antenna and each connectable to a respective set of condenser plates of the series of sets, a lead connected to the single set of plates whereby said single set of plates may be connected to an amplifying circuit, switch means operatively associated with the movable member and arranged to connect the cooperating set of plates of the series of sets and the load coil associated therewith in series between the antenna and single set of plates, said switch means including a cam carried by the movable member and a series of switches operated successively by the rotation of said cam and each controlling the circuit through a respective load coil.

3. In radio receiving apparatus, a pair of relatively rotatable members comprising a shaft and a ring, one of which is fixed and the other movable, a series of sets of condenser plates arranged around and carried by the ring, a single set of condenser plates carried by the shaft and arranged for selective cooperation with the first sets of condenser plates, an antenna, a series of load coils connected in multiple to said antenna and each connectable to a respective set of condenser plates of the series of sets, a lead connected to the single set of plates whereby said single set of plates may be connected to an amplifying circuit, switch means operatively associated with the movable member and arranged to connect the cooperating set of plates of the series of sets and the load coil associated therewith in series between the antenna and single set of plates, said switch means including a cam carried by the movable member and a series of switches operated successively by the rotation of said cam and each controlling the circuit through a respective load coil, and a second pair of members one of which is fixed and the other movable and comprising a single graduated tuning dial and an index therefor, the movable member of the second pair being operatively associated with the movable member of the first pair.

4. In radio receiving apparatus, a pair of relatively rotatable members comprising a shaft and a ring, one of which is fixed and the other movable, a series of sets of condenser plates arranged around and carried by the ring, a single set of condenser plates carried by the shaft and arranged for selective cooperation with the first sets of condenser plates, the several sets of the

series of plates having different capacities, an antenna, a series of load coils connected in multiple to said antenna and each connectable to a respective set of condenser plates of the series of sets, a lead connected to the single set of plates whereby said single set of plates may be connected to an amplifying circuit, switch means operatively associated with the movable member and arranged to connect the cooperating set of plates of the series of sets and the load coil associated therewith in series between the antenna and single set of plates, said switch means including a cam carried by the movable member and a series of switches operated successively by the rotation of said cam and each controlling the circuit through a respective load coil, and a second pair of members one of which is fixed and the other movable and comprising a single graduated tuning dial and an index therefor, the movable member of the second pair being operatively associated with the movable member of the first pair.

5. In radio receiving apparatus, a pair of relatively rotatable members comprising a shaft and a ring, one of which is fixed and the other movable, a series of sets of condenser plates arranged around and carried by the ring, a single set of condenser plates carried by the shaft and arranged for selective cooperation with the first sets of condenser plates, an antenna circuit, switch means operatively associated with the movable member and connecting the cooperating condenser sets in said circuit, and pilot lights equal in number to the sets of condenser plates of said series, said switch means effecting closure of a circuit through a respective pilot light simultaneously with the closing of a circuit through a respective set of condenser plates of said series of sets, said switch means including a cam carried by the movable member and a series of switches operated successively by the rotation of said cam and each controlling the circuit through a respective load coil.

6. In radio receiving apparatus, a pair of relatively rotatable members comprising a shaft and a ring, one of which is fixed and the other movable, a series of sets of condenser plates arranged around and carried by the ring, a single set of condenser plates carried by the shaft and arranged for selective cooperation with the first sets of condenser plates, the several sets of the series of plates having different capacities, an antenna circuit, switch means operatively associated with the movable member and connecting the cooperating condenser sets in said circuit, and pilot lights equal in number to the sets of condenser plates of said series, said switch means effecting closure of a circuit through a respective pilot light simultaneously with the closing of a circuit through a respective set of condenser plates of said series of sets, said switch means including a cam carried by the movable member and a series of switches operated successively by the rotation of said cam and each controlling the circuit through a respective load coil.

7. In radio receiving apparatus, a pair of relatively rotatable members comprising a shaft and a ring, one of which is fixed and the other movable, a series of sets of condenser plates arranged around and carried by the ring, a single set of condenser plates carried by the shaft and arranged for selective cooperation with the first sets of condenser plates, an antenna, a series of load coils connected in multiple to said antenna and each connectable to a respective set of condenser plates of the series of sets, a lead connected to the single set of plates whereby said single set of plates may be connected to an amplifying circuit, switch means operatively associated with the movable member and arranged to connect the cooperating set of plates of the series of sets and the load coil associated therewith in series between the antenna and single set of plates, and pilot lights equal in number to the sets of condenser plates of said series, said switch means effecting closure of a circuit through a respective pilot light simultaneously with the closing of a circuit through a respective set of condenser plates of said series of sets, said switch means including a cam carried by the movable member and a series of switches operated successively by the rotation of said cam and each controlling the circuit through a respective load coil.

8. In radio receiving apparatus, a pair of relatively rotatable members comprising a shaft and a ring, one of which is fixed and the other movable, a series of sets of condenser plates arranged around and carried by the ring, a single set of condenser plates carried by the shaft and arranged for selective cooperation with the first sets of condenser plates, the several sets of the series of plates having different capacities, an antenna, a series of load coils connected in multiple to said antenna and each connectable to a respective set of condenser plates of the series of sets, a lead connected to the single set of plates whereby said single set of plates may be connected to an amplifying circuit, switch means operatively associated with the movable member and arranged to connect the cooperating set of plates of the series of sets and the load coil associated therewith in series between the antenna and single set of plates, and pilot lights equal in number to the sets of condenser plates of said series, said switch means effecting closure of a circuit through a respective pilot light simultaneously with the closing of a circuit through a respective set of condenser plates of said series of sets, said switch means including a cam carried by the movable member and a series of switches operated successively by the rotation of said cam and each controlling the circuit through a respective load coil.

9. In radio receiving apparatus, a pair of relatively rotatable members comprising a shaft and a ring, one of which is fixed and the other movable, a series of sets of condenser plates arranged around and carried by the ring, a single set of condenser plates carried by the shaft and arranged for selective cooperation with the first sets of condenser plates, an antenna, a series of load coils connected in multiple to said antenna and each connectable to a respective set of condenser plates of the series of sets, a lead connected to the single set of plates whereby said single set of plates may be connected to an amplifying circuit, switch means operatively associated with the movable member and arranged to connect the cooperating set of plates of the series of sets and the load coil associated therewith in series between the antenna and single set of plates, a second pair of members one of which is fixed and the other movable and comprising a single graduated tuning dial and an index therefor, the movable member of the second pair being operatively associated with the movable member of the first pair, and pilot lights equal in number to the sets of condenser plates of said series, said switch means effecting closure of a circuit

through a respective pilot light simultaneously with the closing of a circuit through a respective set of condenser plates of said series of sets, said switch means including a cam carried by the movable member and a series of switches operated successively by the rotation of said cam and each controlling the circuit through a respective load coil.

10. In radio receiving apparatus, a pair of relatively rotatable members comprising a shaft and a ring, one of which is fixed and the other movable, a series of sets of condenser plates arranged around and carried by the ring, a single set of condenser plates carried by the shaft and arranged for selective cooperation with the first sets of condenser plates, the several sets of the series of plates having different capacities, an antenna, a series of load coils connected in multiple to said antenna and each connectable to a respective set of condenser plates of the series of sets, a lead connected to the single set of plates whereby said single set of plates may be connected to an amplifying circuit, switch means operatively associated with the movable member and arranged to connect the cooperating set of plates of the series of sets and the load coil associated therewith in series between the antenna and single set of plates, a second pair of members one of which is fixed and the other movable and comprising a single graduated tuning dial and an index therefor, the movable member of the second pair being operatively associated with the movable member of the first pair, and pilot lights equal in number to the sets of condenser plates of said series, said switch means effecting closure of a circuit through a respective pilot light simultaneously with the closing of a circuit through a respective set of condenser plates of said series of sets, said switch means including a cam carried by the movable member and a series of switches operated successively by the rotation of said cam and each controlling the circuit through a respective load coil.

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