

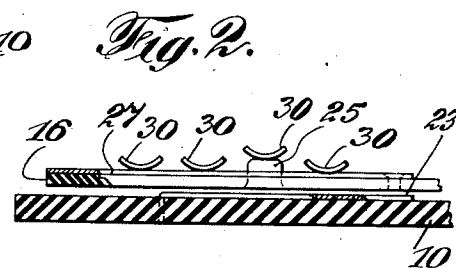
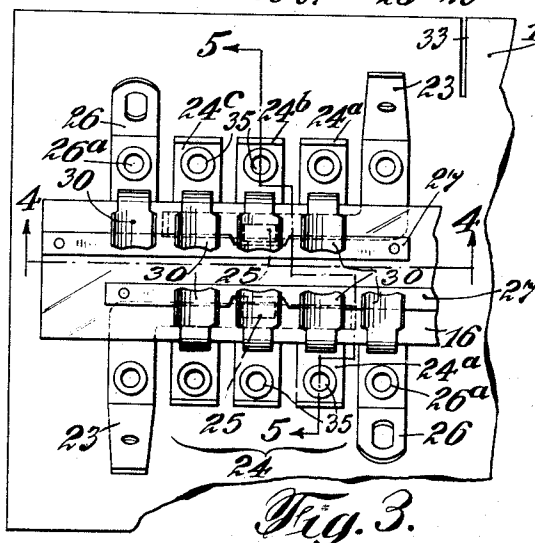
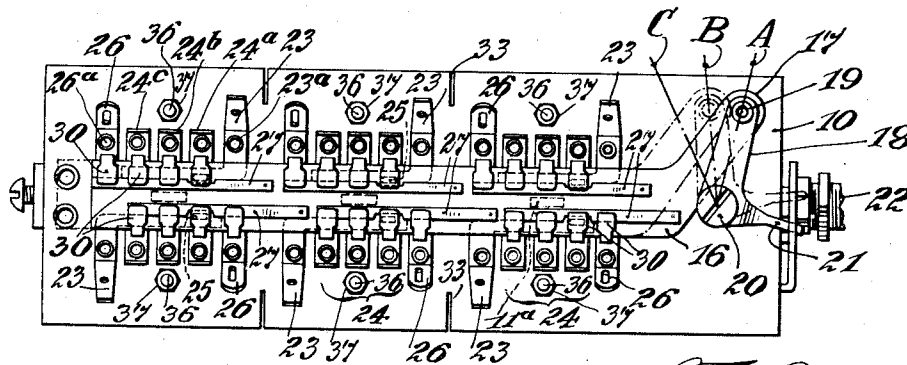
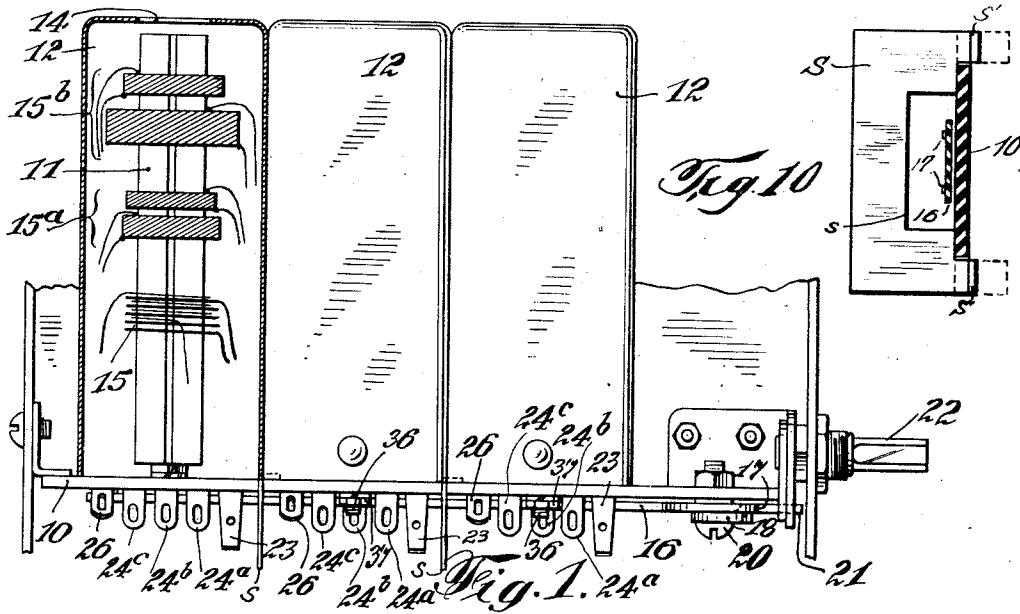
Dec. 22, 1936.

A. C. GROHSGAL
MULTIBAND RADIO APPARATUS

2,064,828

Filed Dec. 31, 1934

2 Sheets-Sheet 1



INVENTOR.
Alexis C. Grohsgal
BY
C. P. Jopfel.
his ATTORNEY.

Dec. 22, 1936.

A. C. GROHSGAL

2,064,828

MULTIBAND RADIO APPARATUS

Filed Dec. 31, 1934

2 Sheets-Sheet 2

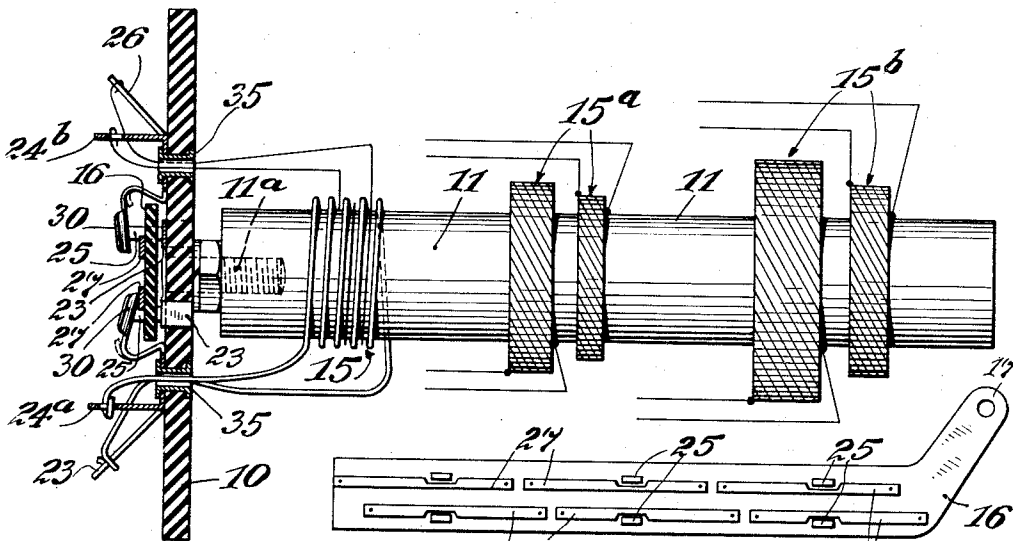


Fig. 5.

Fig. 6.

Fig. 7.

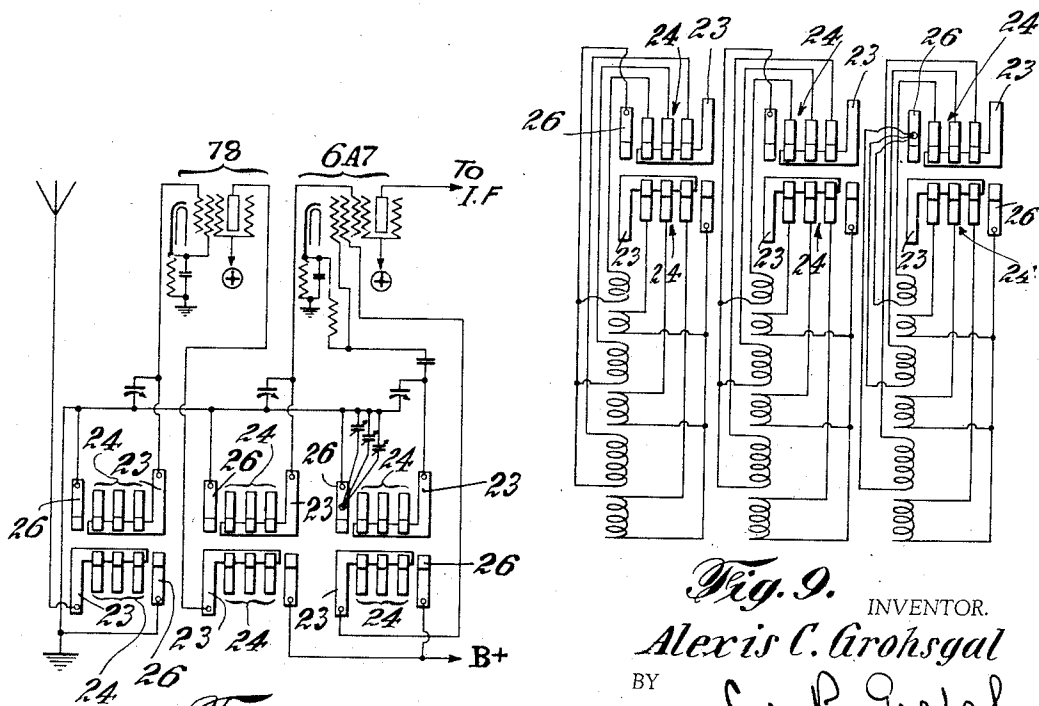


Fig. 8.

Fig. 9.

INVENTOR.

Alexis C. Grohsgal

BY

C. P. Juefel.

his ATTORNEY.

UNITED STATES PATENT OFFICE

2,064,828

MULTIBAND RADIO APPARATUS

Alexis C. Grohsgal, Englewood, N. J., assignor of
one-half to Joseph J. Steinharter, New York,
N. Y., and one-half to himself

Application December 31, 1934, Serial No. 759,893

6 Claims. (Cl. 171-119)

This invention relates to multi-band radio apparatus and has for its object to replace the band switch and the coils in the multi-band radio apparatus by a combination switch-coil for such multi-band radio apparatus.

This combined switch-coil for multi-band radio apparatus eliminates any inbetween wiring from switch to coils and thereby decreases the length of high-frequency leads which, in turn, increases the efficiency of the apparatus.

By eliminating all external wiring from switch to coil, the improved combination switch-coil practically reduces the complicated tuner-section of the multi-band set to the simplicity of a single-band set. Among the advantages of my invention is the increase of efficiency of the set by shortening high-frequency leads and simplifying the multi-band tuner of the set to the point where the set manufacturer finds the multi-band set as simple as the single-band set.

The invention consists generally of a base plate supporting the coils and the switching device. The switching device is arranged to bring respective bands into play.

The invention will be further described herein-after, embodiments thereof shown in the drawings, and the invention will be pointed out in the claims appended hereto.

In the accompanying drawings,—

Figure 1 is a top view of my improved combination switch coil which is adapted to be mounted into the chassis of the radio apparatus;

Figure 2 is a front elevation of the device shown in Fig. 1;

Figure 3 is an enlarged fragmentary front view of one of the units shown in Fig. 2;

Figure 4 is a partial section taken on the line 4-4 of Fig. 3;

Figure 5 is a section taken on line 5-5 of Fig. 3, this Figure 5 being on an enlarged scale;

Figure 6 is a detailed view of the sliding bar of the switch, having contact pieces thereon;

Figure 7 is a front elevation of the device shown in Fig. 6;

Figure 8 is a diagrammatic view of the wiring diagram, being the external wiring of the switch;

Figure 9 is a diagrammatic view of the wiring diagram, being the internal wiring of the switch; and

Figure 10 is a sectional detailed view showing the type of shield or barrier plate which is disposed between adjacent switch groupings and secured in place in the slits in the base.

Referring to the drawings, and more particularly to Figs. 1 and 2 thereof, a base plate 10 of in-

ulated material has supported thereon, as in the embodiment shown, at one side thereof, a number of coil posts 11, on which there are coils as is well-known. Only one of these coil posts 11 is shown, there being coil posts in the enclosures 12 made of metal in which when the enclosed coils contact with each other, are self contained, that is, the coil is surrounded by four walls of the enclosures 12. Each of the enclosures or casings 12 has an opening at the bottom thereof indicated by 14, and at the other end of the casings there are provided projections on the casings 12, which pass through the base plate 10 and these projections are screw-threaded, and upon the screw-threaded projections 36 a screw-threaded nut 37 is provided, whereby the base plate 10 is held to the casings 12. On the other side of the base plate 10, a slidable bar 16 is provided which has an angular portion 17, where an elbow lever 18 is pivoted at 19. The elbow lever 18 is pivoted at 20 and the free end of the elbow lever indicated by 21, is connected with a rotatable member 22 preferably provided with a gnarled knob to enable the member 22 to be rotated and thereby operate the free end of the elbow lever around the pivot 20, and due to the pivot connection 19 operate the sliding bar 16.

The sliding bar 16 is of insulated material and has thereon raised portions 25 and conduit bars 27, as shown in Figs. 6 and 7. Upon the same face of the base plate 10, there is a member 23 which has an opening 23a, and there is a corresponding opening in the base plate, these openings permitting wires to pass therethrough, as shown clearly in Fig. 5. The connection 23 extends below the slidable insulating plate 16 as shown in dotted lines. There is a similar connection 26 with a similar opening 26a in the connection and in the base plate and intermediate the connections 23 and 26 there are arranged connection pieces 24a, 24b and 24c, each again having an opening in registration with an opening in the base plate for the passage of wires therethrough. Directly opposite the connections just described are similar connections save that they are disposed in a different way, in that the connection heretofore described as 23 is diagonally opposite. There is a similar connection to 26 diagonally opposite thereto. The connections 23, 23a, 24b, 24c and 26 each have upwardly extending and bent members which extend over the bar 16 and contact with the electrical conduits 27 on said bar 16 (see Fig. 6). The operation of the slide bar 16 is such that when it is moved in a certain position the raised portion 25 of Fig. 6 55

will raise the lips which extend from the connections, such lips being indicated by 30, and in Fig. 2 it will be noticed that the lip corresponding to connection 24a is raised and by such raising of the lip, the lip is brought out of contact with the conduit bar 27. The other lips 30 remain in contact with the conduit bar 27.

Thus by the shifting of the slide 16 with its conduits 27 and with its raised members 25 thereon, various connections can be made, depending upon which lip is raised and which lips are in contact with the conduits.

The description which has just been made in connection with the parts is shown in an enlarged view in Fig. 3, but in practice there are three groups such as shown in Fig. 3, and these groups are shown in Fig. 2 on one side of the base plate 10, which groups correspond with the coils 11 in enclosures 12 of Fig. 1.

The switching device shown in the embodiment of the drawings consists of six groups of contacts designed to bring the respective bands into play. Of course any number of groups of contact can be provided. Each group consists of five different types of contact, namely, the master contact 23, the spring contacts 24a, 24b, 24c, the knife contact 25, the shunting contact 26 and the shunting bar heretofore referred to as a conduit bar 27. The master contact 23 is mounted on the base plate and extends under all spring contacts 24a, 24b and 24c. The knife contact 25 is mounted on the slider 16. The slider 16 has three or any number of positions indicated by A, B and C, as shown by the various positions of the pivot 19 in Fig. 2. The knife contact 25 establishes connections between the master contact 23 and the spring contact 24. The shunting contact 26 establishes connections through the shunting bar 27 mounted permanently on the slider 16 to the spring contacts 24.

In a position corresponding to "A", the following connections are established: between 23, 24a and 25 in one circuit, and between 26, 27, 24b and 24c.

In a position "B", the following connections are established: between 23, 24b and 25 in one circuit and between 26, 27, 24a and 24c.

In a position "C", the following connections are established: between 23, 24c and 25 in one circuit and between 26, 27, 24a and 24b.

As above stated, the slider 16 can be manipulated into positions A, B or C by any suitable device through the turning of a knob or any other handle mounted on the shaft 22 protruding through the control panel of the radio apparatus.

The coil windings on the coil post 11 have the leads brought out directly to the respective switch terminals for any desirable switching circuit.

In Fig. 8, there is shown an electric diagram of a standard popular multi-band circuit to which the invention has been applied. In this instance, all of the high frequency wires such as grids, and plates of tubes and the antenna lead are connected respectively to the master contacts 23 and the shunting contacts 26 serve as a common "B" terminal or grid returns respectively. In this circuit, however, only the grid return leads of the oscillator group are not connected to the shunting contact 26, but are brought out individually to the respective padding condensers of the circuit.

In Fig. 9, there is shown a diagrammatic sketch of a set of multi-band coils of popular design wired into the novel switch forming my improvement.

In respect to these diagrams 8 and 9 in so far as their electrical connections are concerned as applicable to radio, these are well-known and are not described in detail, other than to state that Fig. 8 shows an external wiring of the switch and Fig. 9 shows the internal wiring of the switch, and by reason of the fact that such radio circuits are well-known, no specific description thereof is being made herein, the novelty claimed herein relating to the novel parts shown in Figs. 1 to 7, and is so far as they are shown in Figs. 8 and 9, novelty is claimed therein.

Referring again to Figs. 2 and 3, it will be noted that slits are provided on the base plate 10, which slits are indicated by 33, and these are for the purpose of enabling a shield S to be inserted therein so that the shield will act as a barrier between the respective groupings of connections as heretofore described. Each shield S has tongues or projections S' which are inserted through the slits 33 and then bent over upon the base whereby to secure the shield to the base at right angles thereto. Each shield is thus attached to extend downwardly from the base plate several inches and thereby act as a barrier between the respective groupings. As shown in Fig. 10, the central portion of each shield, adjoining the base is cut away to provide an opening s in which the slide member 16 operates.

As has been above shown by the slidability of the slider 16, the shunting bar 27 on the slider is designed to short out all windings of wave bands not in play. Shorting out of idle windings decreases undesirable inductances within the coil, strongly tending to increase the efficiency of the tuner.

It will be seen that always three lips contact with the shunting bars 27.

It will also be noted that the switch connections are held in the embodiment shown to the base plate 10, by an eyelet-like member 35, through which the wire in each case passes.

The coils are indicated by 15, 15a and 15b, and the coil post 11 is secured to the base plate by a screw 11a.

From the foregoing, it will be seen that the invention resides in the provision of a common plate for the coils on the one hand, and for all the switch connections necessary to put wave bands into or out of play, on the other hand. In the embodiment shown, the switch connections are on one side of the plate and the coils on the other side, which made a very simple and composite structure, but I do not wish to be limited to this particular embodiment, as many adaptations of this particular construction may be desired. But in respect to the embodiments herein illustrated, I emphasize particularly that the base plate 10 has the openings as shown clearly in Fig. 5 through which the wires of the coils pass, which wires are then connected by bending over to the uprights of the connections. I also emphasize particularly the use of the shunting bar cooperating with the lips of the connections, which lips may be severally placed out of contact by means of the knife contact 25, all of which is very clearly shown in Fig. 5 of the drawings.

It will be also particularly noted that the coil forms are placed directly upon the base plate, and that there are no connecting lugs on the coil forms between the coil or coils and the switch.

It will be noted that the simplicity of the device by combining the coils and the switch upon a common plate serves to eliminate any inbetween wiring from switch to coils, thus decreasing the

length of the high frequency leads which in turn increases the efficiency of the apparatus. The composite and self-contained character of the embodiment does away with a very complicated set of wiring between coils and switches as now used, and by eliminating all external wiring from switch to coil, this combination device practically reduces the complicated tuner-section of the multi-band set to the simplicity of a single-band set.

I have shown various embodiments, but I do not wish to be limited therein, as changes may be made without departing from the spirit of my invention as defined in the appended claims.

I claim:—

1. A combination switch coil for multi-band radio apparatus, comprising a base plate, coil supports secured to the base plate, coils on said coil supports, switch connections directly connected with the coils, a shunting contact on the base plate, a slider, a knife contact on the slider, a shunting bar on the slider, devices connecting said contacts and bar, and means for moving the slider to connect the knife contact with one of said devices and the shunting bar with the other devices, whereby the different wave bands go through into or out of circuit.

2. In a combination switch-coil for multi-band radio apparatus, a base plate, switch devices arranged in groupings on said base plate, the latter having therein slits disposed between the groupings of said switch devices, and barrier plates disposed between the groupings for separating the same and having portions entered in the slits to secure the barrier plates to the base plate thereby.

3. In a combination switch-coil for multi-band radio apparatus, a base plate having openings therein, switch connections having openings in communication with the base plate openings, a

slider on the base plate, and switch devices arranged on each side of the slider whereby upon the movement of the slider, the slider selectively connects with certain switch connections and throws others out of circuit, depending upon the wave band desired, and lead wires between the switch coils and switch connections extending through the base plate openings and communicating openings of the switch connections.

4. In a combination switch-coil for multi-band radio apparatus, a base plate having openings therein, switch connections having openings therein in registration with the openings of the base plate, said registering openings being adapted for the passage of wires from the coils of wave bands, and said switch connections being adapted to contact with electrical connections completing circuits for said wave bands.

5. In a combination switch-coil for multi-band radio apparatus, a switch device comprising a member having an opening adapted to be placed in registration with an opening of its supporting plate, and a lip portion extending from the switch device, said lip portion being flexible and readily movable into or out of connection.

6. In a combination switch-coil for multi-band radio apparatus, a stationary base plate, a slide movable thereon and carrying an electrical conduit and knife contacts, switch contacts on the base plate having raisable portions normally engaging said conduit and adapted to be raised therefrom when acted on by said knife contacts, coil forms mounted directly upon the base plate, windings on said coil forms having their respective leads going directly to the switch contacts on the base plate, without intermediate lugs.

ALEXIS C. GROHSGAL.