

Dec. 21, 1937.

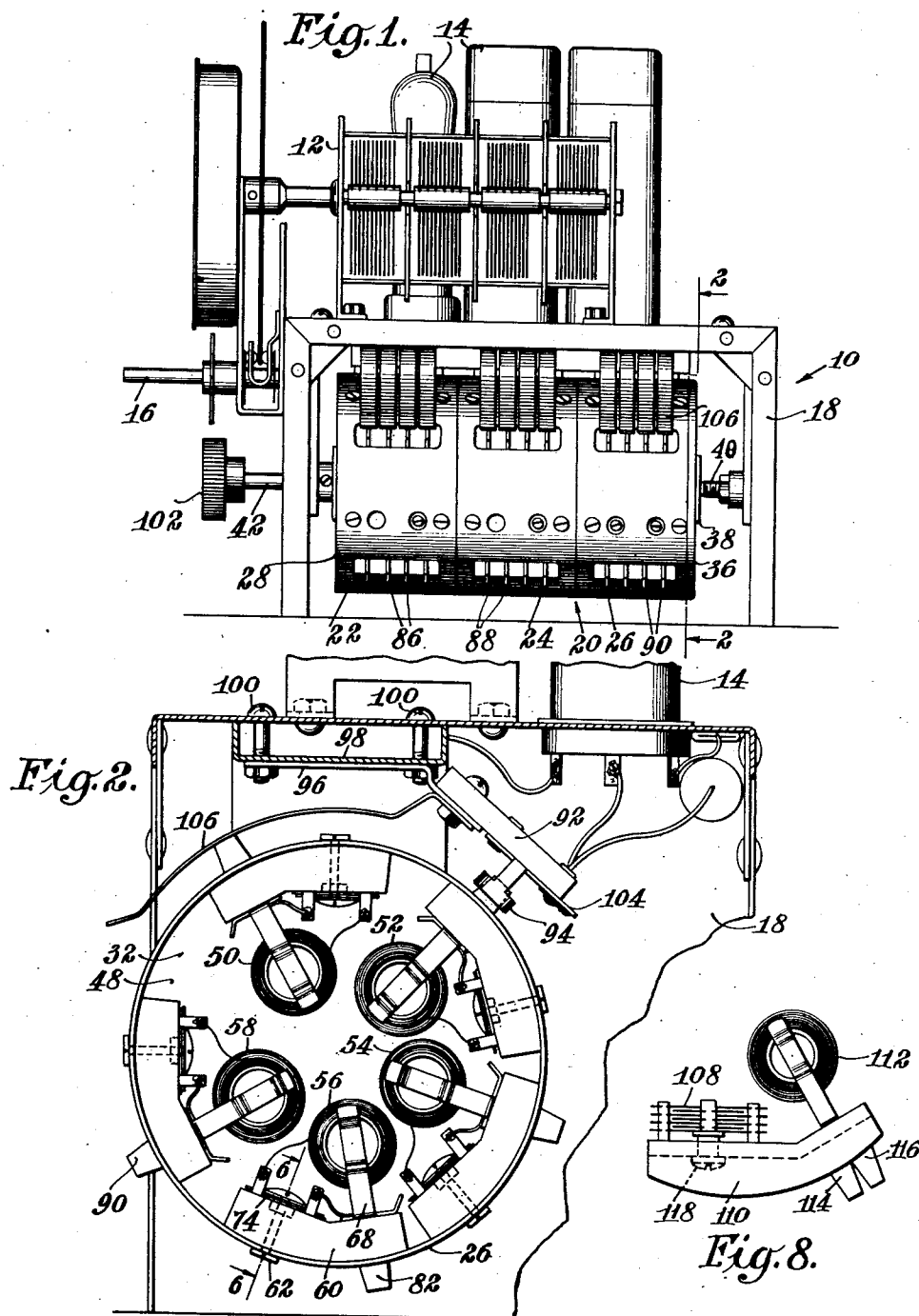
W. P. LEAR

2,103,035

SWITCHING AND SUPPORTING DEVICE FOR ELECTRICAL APPARATUS

Filed Aug. 31, 1934

2 Sheets-Sheet 1



BY

INVENTOR:
William P. Lear
J. R. Holdsworth
ATTORNEY.

Dec. 21, 1937.

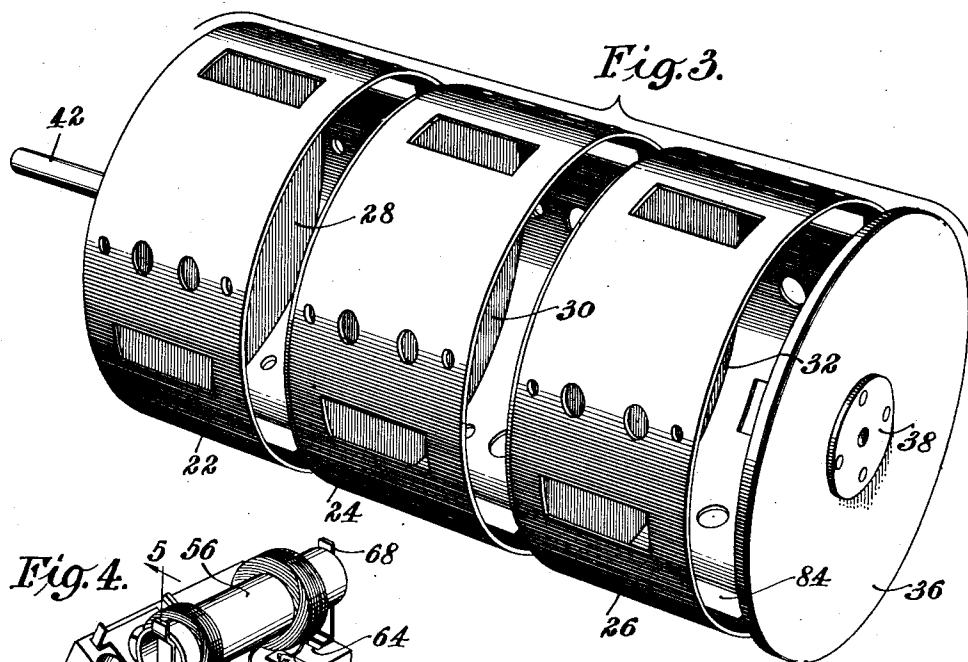
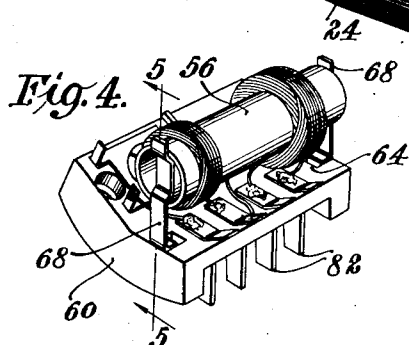
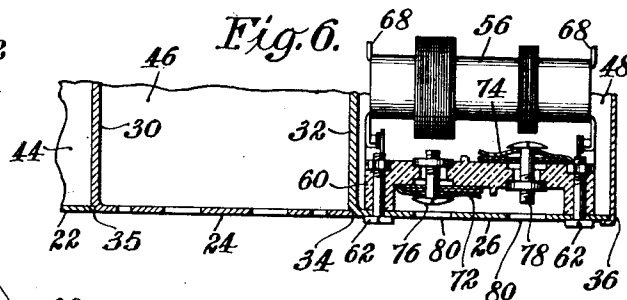
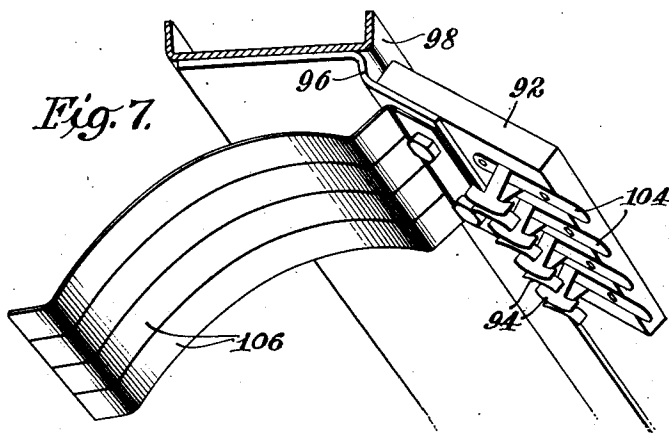
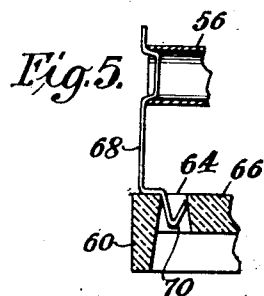
W. P. LEAR

2,103,035

SWITCHING AND SUPPORTING DEVICE FOR ELECTRICAL APPARATUS

Filed Aug. 31, 1934

2 Sheets-Sheet 2



INVENTOR:
William P. Lear,
BY *J. R. Goldsborough*
ATTORNEY.

UNITED STATES PATENT OFFICE

2,103,035

SWITCHING AND SUPPORTING DEVICE FOR
ELECTRICAL APPARATUS

William P. Lear, New York, N. Y., assignor, by
mesne assignments, to Radio Corporation of
America, New York, N. Y., a corporation of
Delaware

Application August 31, 1934, Serial No. 742,230

3 Claims. (Cl. 171-119)

My invention relates to improvements in switching and supporting devices for electrical apparatus.

One of the objects of my invention is to provide an improved switch and supporting device adapted particularly for use in connection with a radio receiver in which a plurality of frequency bands are used to cover a required frequency range.

Another object of my invention is to provide means whereby the various connections to the respective groups of coils and other parts for each band may be changed quickly and easily.

Another object of my invention is to provide an improved switch and supporting device, of the character referred to which is so constructed that adjustments of various parts such as the so-called trimming or lining-up condensers may be easily made, and access to the various parts may be readily had for repair or replacement.

Other objects and advantages will hereinafter appear.

For the purpose of illustrating my invention, an embodiment thereof is shown in the drawings, wherein

Figure 1 is a side elevational view of a radio receiver embodying my improved switch and supporting construction for the various parts;

Fig. 2 is an enlarged sectional view, the section being taken on the line 2-2 in Fig. 1;

Fig. 3 is a perspective view of the parts comprising the switch and supporting drum in Fig. 1, the parts being shown in their proper relation to each other for assembly;

Fig. 4 is a perspective view of one of the electrical units associated with the switch and supporting drum;

Fig. 5 is a sectional view, the section being taken on the line 5-5 in Fig. 4;

Fig. 6 is an enlarged sectional view, the section being taken on the line 6-6 in Fig. 2;

Fig. 7 is an enlarged, fragmentary, perspective view, taken from Fig. 2; and

Fig. 8 is an elevational view showing a modification of the electrical unit shown in Fig. 4.

In Fig. 1, my improved switch and supporting device is designated generally by the reference character 10, and is shown embodied in a radio receiver and supporting the usual tuning condenser 12 and the various other associated parts such as the tubes 14 and the manually operable shaft 16 for adjusting the condenser 12.

The device 10 comprises a U-shape frame 18 in which a hollow drum 20 is supported for rotation about its longitudinal axis. The drum is comprised of casing sections 22, 24 and 26 pro-

vided with end walls 28, 30 and 32, respectively, and aligned with respect to and engaging and fitting each other to comprise the switch drum.

As more clearly shown in Fig. 6, the edge of the end wall 32 of the casing section 26 is flanged at 34 to receive the edge of the adjacent casing section 24. The casing sections 22 and 24 are fitted together in like manner at 35 so that when the casing sections are assembled, as in Fig. 1, they are properly aligned with respect to each other, concentric about the common axis of the drum which they comprise.

For the purpose of supporting the drum 20 for rotation about its longitudinal axis, the casing section 26 is provided with an end plate 36 to which is secured a bearing disc 38 for receiving the tapered end of a stud screw 40 which is fixed in one end of the frame 18. A stud shaft 42 is fixed to the end wall 28 of the casing section 22, and extends outwardly through and has a bearing in the other end of the frame 18.

By reason of the construction just described, the drum 20 is hollow and has a cylindrical wall continuous from end-to-end thereof, and is partitioned off by the end walls of the casing sections to form enclosed chambers 44, 46 and 48 for electrical apparatus such as the coils and the trimming or so-called padding condensers connected in the different circuits of the receiver.

Assuming that the receiver is to operate over five different frequency bands to cover the range embraced by all, five coils 50, 52, 54, 56 and 58 for the respective bands will be disposed in the chamber 48 of the drum, as shown in Fig. 2, and five corresponding coils will be similarly disposed in each of the chambers 44 and 46.

The coils of the three groups of five form part of, respectively, the three tuned circuits of the receiver.

The coil 56 is mounted on a base element or member 60 of insulating material, fixed to the cylindrical wall of the drum by bolts 62. The base member is provided with rectangular openings 64 extending inwardly into this member from the surface 66 thereof, and tapered as shown in Fig. 5. Supports 68 of spring material are bent as shown to engage the opposite ends of the coil 56 to support it above the surface 66. One end of the supports 68 is bent at an acute angle to provide a spring portion 70 which, when this end of the support is forced into the opening 64, is tensioned to lock the support in place with respect to the base member. In placing the coil 56 in position, the supports 68 are sprung outwardly to receive the coil, after which they are

released to engage the ends of the coil, as shown in Fig. 4. In this way the supports are kept under tension, to hold the coil firmly.

Trimming condensers 72 and 74 are disposed on each side of the base member 60, as more clearly shown in Fig. 6, and are provided respectively with the adjusting screws 76 and 78. Adjustment of these condensers may be readily made by inserting a screw-driver into the openings 80 in the wall of the drum to turn the adjusting screws.

Connections between the trimming condensers and the coil are made in the manner required for the particular circuit of the receiver, as will be well understood, and the respective terminals are connected respectively to contacts 82 carried by the base member 60 and extending laterally outwardly from the side opposite to that from which the coil 56 is supported. The casing section 26 is provided with a slot 84 parallel to the longitudinal axis of the drum and through which the set of switch contacts 82 extends. The ends of the contacts protrude outwardly beyond the cylindrical wall, as shown in Fig. 2.

The coils 50, 52, 54 and 58, and the associated condensers, are mounted and supported in the same manner as the coil 56 and the condensers 72 and 74.

For any particular frequency band over which the receiver is to operate, there will be one of the coil and condenser units in each of the casing sections, these units being aligned so that their respective contacts, such as the contacts 86, 88 and 90 in Fig. 1, are disposed in a line parallel to the axis of the drum 20.

Associated with each of the drum sections is a base 92 of insulating material provided with a set of contacts 94 for engagement selectively with the five sets of contacts protruding outwardly from this section. The base members 92 are supported from a plate 96 secured to the underside of a U-shape channel member 98. The member 98 is secured to the frame 18 by bolts 100. The three base members 92 are so disposed that all the contacts 94 are in a line parallel to the axis of the drum 20. When the drum is rotated by a knob 102 fixed on the end of the shaft 42, the different sets of contacts for the different frequency bands are engaged selectively with the complementary, fixed contacts 94.

With the drum 20 in a particular position, such as shown in Figs. 1 and 2, the proper coils and condensers are connected in circuit with the other parts of the receiver by way of connections 104 from the fixed contacts 94.

With any set of coils in position for connection in the circuit, undesired resonance effects are prevented by grounding the adjacent coils of an adjacent frequency band. This is accomplished by resilient contacts 106 supported from the plate 96, and which are bent, as shown in Fig. 2, on an arc of a circle concentric to the axis of the drum 20. When the drum is rotated in a counter-clockwise direction, as viewed in Fig. 2, the contacts associated with the coils previously connected in the circuit engage and are grounded to the frame by the contacts 106 as the next set of coils are moved into operating position.

If desirable, air trimmer condensers 108 may be mounted on the base 110 of the electrical units, as shown in Fig. 8, and a coil 112, corresponding to the coil 56 in Fig. 4, supported on the same side of the base.

If it is required that each unit be provided with more than four contacts as in Fig. 4, such as

might be the case when additional connections are necessary for automatic volume control, for example, it is proposed to provide the base 110 of each unit with two rows of contacts 114 and 116, the contacts 114 being staggered with respect to the contacts 116. For example, there might be three of the contacts 114 and three of the contacts 116. In such case, it will be understood that the number of contacts 94 and 106 will be increased accordingly.

For the purpose of adjusting the condensers 108, the shaft carrying the movable blade or blades is provided with a slotted head 118 corresponding to the slotted ends of the adjusting screws 76 and 78 in Fig. 6, which take the same position as the latter to permit application of a tool for making the adjustment.

In lieu of the stub shafts 40 and 42 for supporting the drum for rotary movement, a continuous shaft may be used, to extend entirely through the drum, and having its ends journaled in the frame 18. In this way, the possible necessity for thrust bearings at the ends of the drum is eliminated. Since the construction with the continuous shaft is reasonably obvious, it has not been illustrated.

From the foregoing it will be seen that I have provided an improved switch and supporting device for electrical apparatus which provides for a quick change from one to any one of a number of different connections in a circuit such as that in a radio receiver, the switch and supporting device being constructed to provide for ready access to the different parts for adjustment, repair or replacement, and being relatively simple in its construction and manner of operation.

While I have illustrated my invention as being embodied in a radio receiver, it will be understood that the same is adaptable to other electrical apparatus wherein it is desirable to connect different parts of the apparatus selectively into the circuit in different ways.

While but one embodiment of my invention has been disclosed, it will be understood that various changes can be made without departing from the spirit of my invention or the scope of the claims.

I claim as my invention:

1. In a tuning device for multi-range radio receivers, in combination, a multi-compartment drum constituted by a plurality of nested metallic chambers, a plurality of electrically disconnected interstage transformer-assemblies circumferentially disposed within each chamber and insulated therefrom, a plurality of rigid contact members connected to each transformer-assembly and projecting radially through openings in the wall of the associated chamber, a plurality of groups of fixed flexible contact members, one group for each chamber, the individual contact members of each group lying in the path of movement of the projecting contact members when the chamber assembly is rotated about its axis and serving to place in circuit the transformers corresponding to any desired adjustment, and a plurality of grounded contact members arcuately spaced apart from the flexible contact members and insulated therefrom, the said grounded contact members also so circumferentially disposed with respect to the several groups of fixed contact members that they serve to short-circuit the transformer-assemblies covering the band of frequencies just below the band at which the receiver may momentarily be adjusted to receive.

2. In a radio tuning device for a multi-stage radio receiver, a multi-compartment drum con-

stituted by a plurality of nested chambers each chamber being provided with a plurality of openings in the wall thereof, a plurality of electrically disconnected interstage transformer-assemblies
5 disposed circumferentially within each chamber and insulated therefrom, a plurality of rigid contact members for each transformer assembly, the said contact members projecting radially through the openings in the associated metallic chamber,
10 a plurality of groups of fixed contact members one group for each stage of the receiver, the individual fixed contact members lying in the path of movement of the projecting rigid contact members when the drum is rotated about its long
15 axis and serving to place in circuit the transformers corresponding to any desired band frequencies, means for rotating said drum about its said long

axis to position the transformer assemblies of a selected chamber in circuit, and means responsive to the movement of said drum for grounding the transformer assembly which is in a chamber adjacent the chamber containing the said circuit-connected transformer assembly. 5

3. The invention as set forth in claim 2 wherein the said grounded transformer assembly corresponds to a frequency band immediately below that of the said circuit-connected transformer
10 assembly, and wherein said grounding means is constituted of a plurality of contact members arcuately disposed with respect to the contact members to which said circuit-connected transformer
15 assembly is connected.

WILLIAM P. LEAR.