

Nov. 24, 1931.

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1,833,235

RADIO RECEIVING APPARATUS

Filed July 22, 1925

3 Sheets-Sheet 1

Fig. 1.

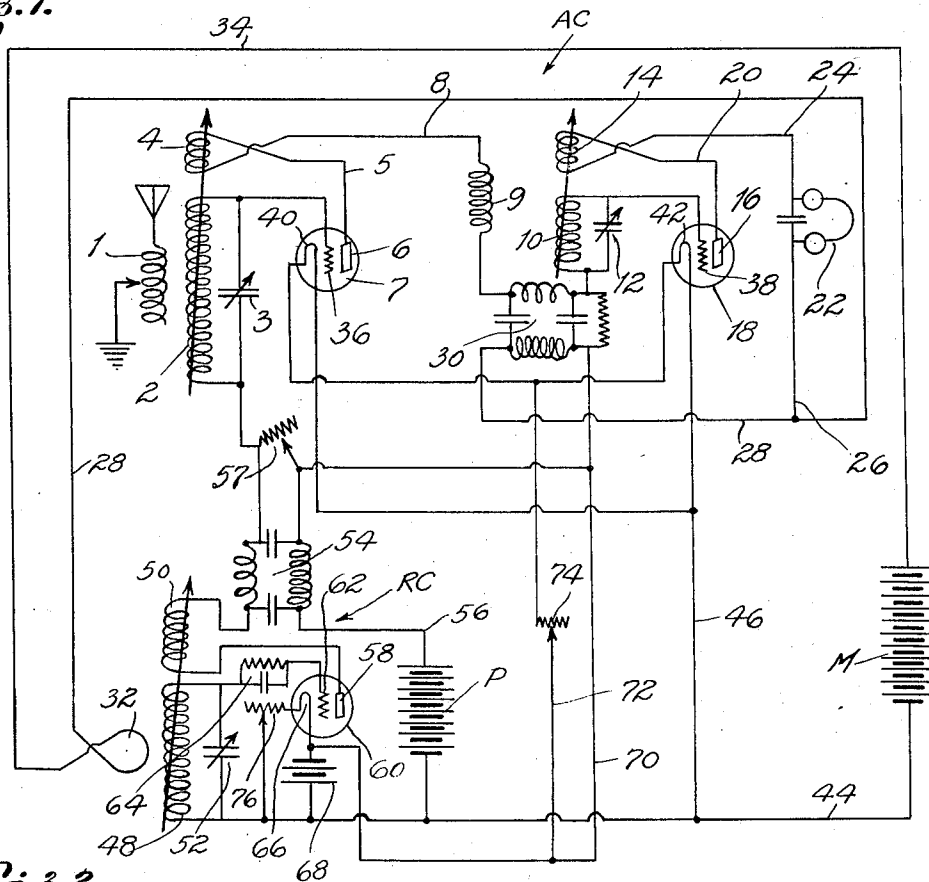
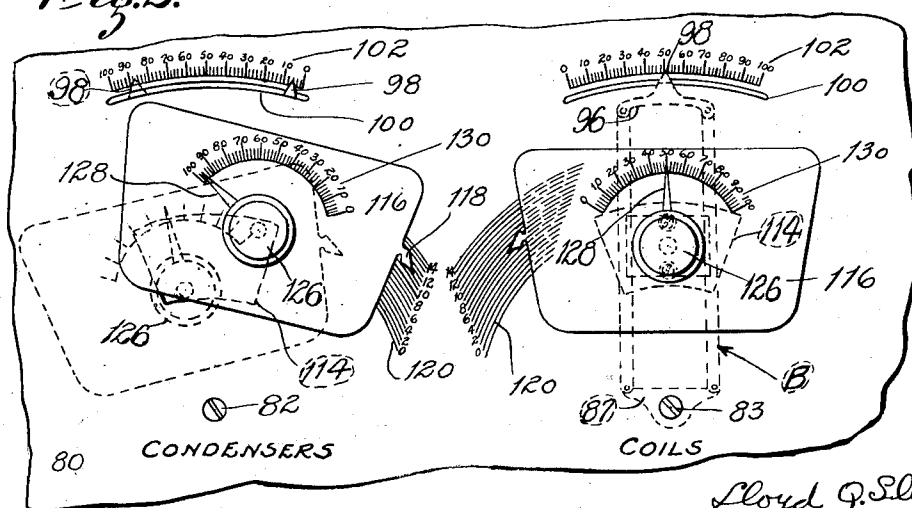


Fig. 2.



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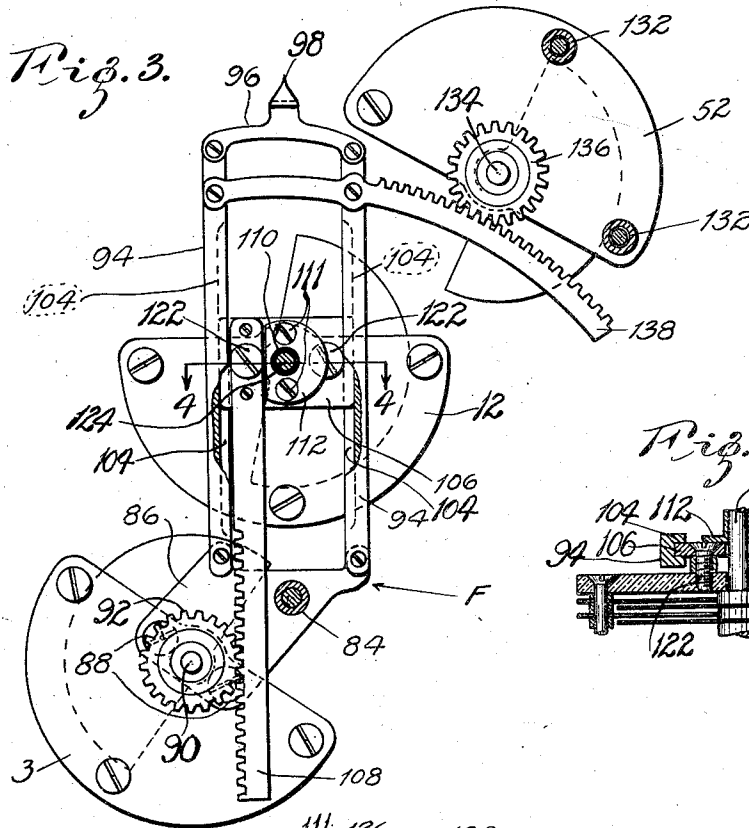
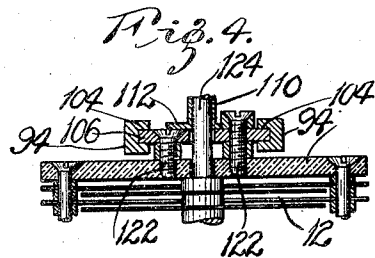
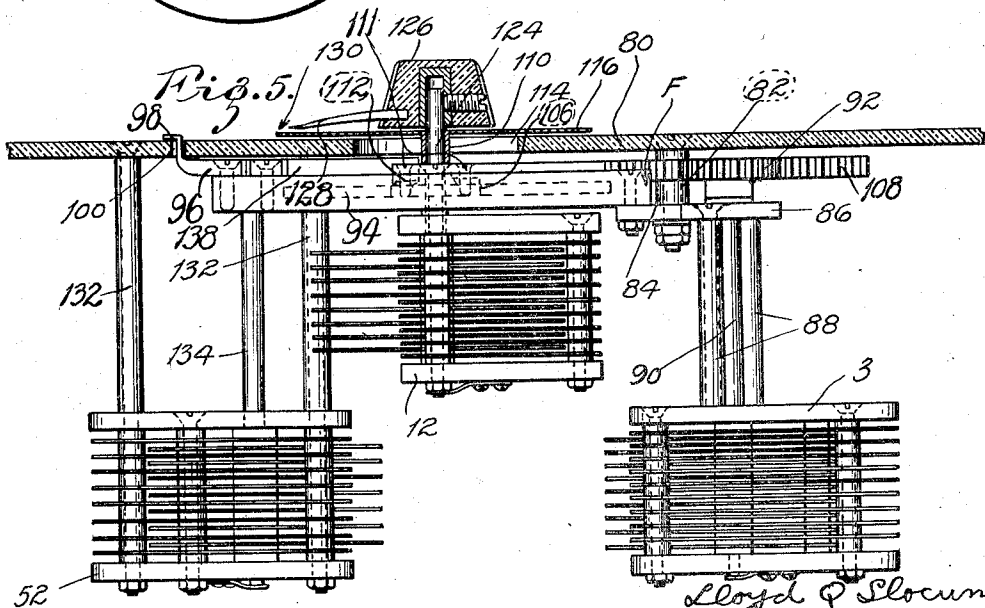
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3 Sheets-Sheet 2



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3 Sheets-Sheet 3

Fig. 6.

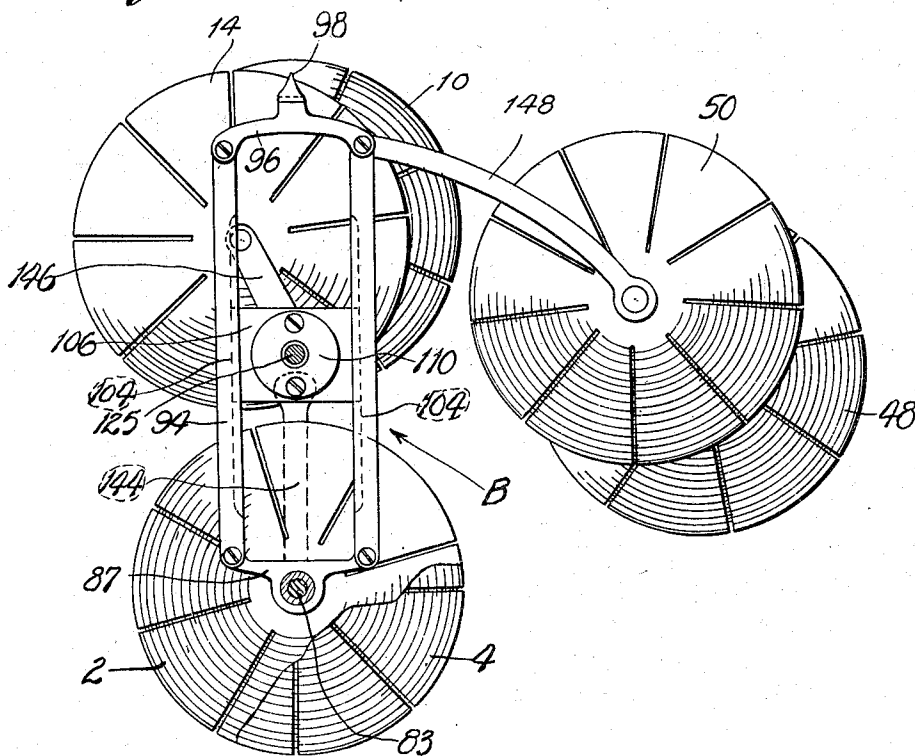
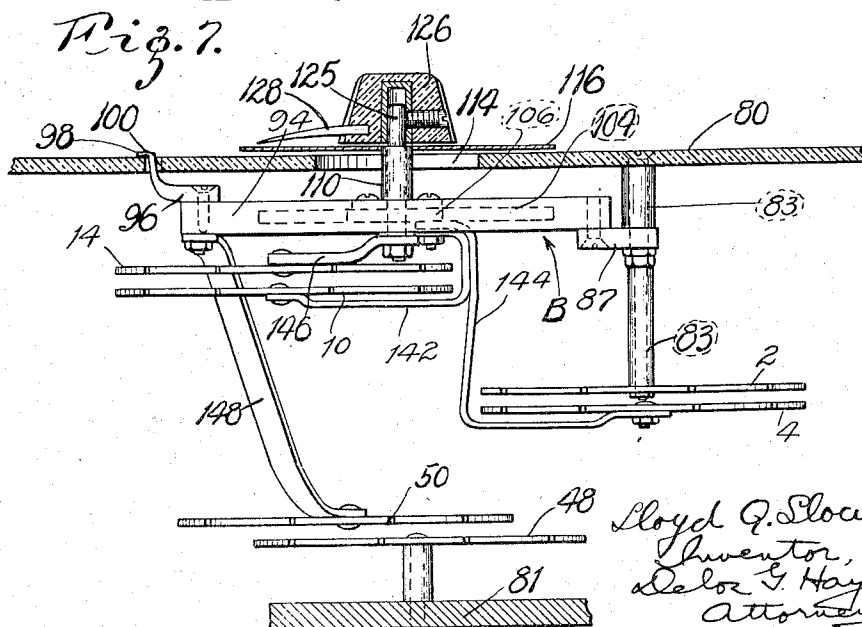


Fig. 7.



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RADIO RECEIVING APPARATUS

Application filed July 22, 1925. Serial No. 45,316.

This invention relates to radio receiving apparatus and with regard to certain more specific features to means for adjusting a multiply controlled radio receiving circuit.

Among the several objects of the invention may be noted the provision of means for simultaneously operating three control elements or instruments of a receiving circuit with one hand and means for simultaneously operating six control elements or instruments of a receiving circuit with the two hands of a single operator, the instruments being operable either in a rotatably and/or translatable fashion. Other objects will appear in part and in part will be pointed out hereinafter.

The invention accordingly comprises the features of construction, combinations of elements, and arrangements of parts which are exemplified in the circuit and structure hereinafter described and the application of which will be indicated in the following claims.

In the accompanying drawings, in which is shown one of various possible embodiments of the invention,

Fig. 1 is a circuit diagram;

Fig. 2 is a plan view of a pair of dial combinations;

Fig. 3 is an assembly plan with parts broken away of an operating linkage for controlling three condensers simultaneously.

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

Fig. 5 is a side elevation of Fig. 3 showing the assembly of that figure applied to a panel;

Fig. 6 is an assembly plan with parts broken away of an operating linkage for controlling three inductance coils simultaneously; and

Fig. 7 is a side elevation of Fig. 6 showing the assembly of Fig. 6 applied to a panel.

Corresponding numerals indicate corresponding parts throughout the several views of the drawings.

Referring now more particularly to Fig. 1 of the drawings, there is shown a tapped coil

1 connected in series with the usual aerial ground circuit. This coil 1 serves as the primary of a loosely coupled circuit having in it a secondary coil 2 shunted by a variable condenser 3. The condenser 3 serves tuning purposes. The primary coil 1 and the secondary coil 2 are wound on the same form but this fact does not affect the present improvements.

Inductively connected with the secondary coil 2 is a reversed feed-back or reaction coil 4 adapted to regeneratively stabilize or resonate the loosely coupled circuit.

The reaction coil 4 is connected by a lead 5 to the plate 6 of an audion tube 7.

Another lead 8 of said coil 4 connects it to one end of a primary 9 which activates another secondary coil 10. A variable condenser 12 is shunted across the coil 10 and a reverse feed-back coil 14 serves purposes with regard to coil 10 as the above named coil 4 does with regard to coil 2. The coil 14 connects with the plate 16 of an audion tube 18 by a wire 20 and to a sound producing device 22 by means of a wire 24. A wire 26 connects the sound device 22 to a lead 28. The lead 28 connects with a stabilizing device 30 which is connected with the coil 10. The other end of the line 28 passes to one side of a single turn coil 32 which is connected by a lead 34 to one side of a battery M.

The coils 2 and 10 are connected to the grids 36 and 38 of the audion tubes 7 and 18 respectively. The filaments 40 and 42 are connected to the other battery lead 44 by a line 46.

Thus far has been described an amplifying circuit AC. A reflexing circuit RC co-operates with this circuit. The reflexive circuit RC comprises a coil 48 activated by said single turn coil 32 and provided with a reversed feed back coil 50. A variable condenser 52 is shunted across the coil 48. The coil 48 and the coil 32 are wound on one form.

The coil 50 connects with the said amplifying circuit by way of a stabilizing device 54

and a resistance 57 and with a battery P by way of said device 54 and a line 56.

The battery P has its other terminal connected with one terminal of the battery M by the said line 44. This line 44 also feeds the coil 48.

The plate 58 of an audion tube 60 is connected to one end of said coil 50. The grid 62 of said tube 60 is connected to one end of the coil 48 and has connected between it and said coil the stabilizer 64. The filament 66 of said tube connects with said line 44 by way of a battery 68. It connects with the aforesaid stabilizing device 30 of the amplifying circuit by way of a line 70 and to the filament circuit of the tubes 7 and 18 by way of the line 72. A variable resistance 74 is placed in the line 72 for the usual purposes. It is to be noted that the other side of the filament 66 is connected to the line 44 by way of a variable resistance 76.

The electrical operation of this circuit need not be gone into here, insofar as the means for making its adjustments simultaneously is the object of this invention. It serves as an example representing any one of many circuits to which this invention may be applied.

The variably adjustable apparatus in this circuit are the three variable resistances 57, 74 and 76; the three variable condensers 3, 12, and 52; and the three reverse feed back coils 4, 14 and 50.

Now it is obvious that for a given set of inadjustable condensers and coils such as are in the stabilizing devices 30, 54 and 64 and for a given configuration of connecting wires in the set as well as for various battery strengths, that the resistances enumerated, viz, 57, 74 and 76, may be more or less permanently adjusted for a wide range of adjustment of the said remaining adjustable condensers 3, 12 and 52, and the coils 4, 14 and 50.

Hence while we may set the resistances more or less permanently, there remains the problem of adjusting at once and by means of one operator, the remaining six instruments.

To accomplish the above end I propose to adjust the three condensers from a single control and the three feed back coils from one control. It is to be understood that by the means hereinafter described, that I can control a combination of condensers and coils from one control also.

Referring now particularly to Figs. 3, 4 and 5 there is illustrated a means for adjusting three condensers from one control.

The numeral 80, Fig. 5 indicates an ordinary radio panel. Rotatably pivoted to the panel (preferably beneath) is a frame F. The pivot is a bolt 82 made fast to the panel. An elongated bearing 84 made fast to the frame F rotates on said bolt.

The frame F comprises a body 86 integrally formed with the rotatable bearing 84. The

body 86 has fastened thereto by means of two spacer bolts 88 a condenser, say one of the condensers aforementioned. I choose the condenser 3 for example. This condenser is operable to be adjusted by a vertical shaft 90 which passes through the body 86 and has fastened at its upper end a pinion gear 92. The gear 92 is located above the body 86.

Permanently bolted to the top of body 86 are two runner pieces 94. These pieces are fastened together by a pointer block 96. The pointer 98 of the block 96 is adapted to pass through an arcuate slot 100 of the panel and point to indicia 102 next to said slot (see Fig. 2). The slot 100 is described with the bolt 82 as center.

The runners 94 are provided with guide slots or tracks 104 for receiving a runner 106 slidably mounted in the guide slots. The runner 106 has fastened horizontally thereto and in line with said slots, a rack 108 which meshes with said pinion 92. Hence sliding movement of the runner 106 causes an adjustment of the coil 3 independent of the rotated position of the body or frame F on its pivot.

Now the runner 106 carries also thereon a stationary bearing 110. The bearing 110 is provided with a flange 112 for bolting or screwing it to the said runner. Screws 111 shown in Figs. 3 and 5 are used for this purpose. The bearing 110 extends through a relatively large opening 114 in the panel 80 (see Figs. 2 and 5). It carries fast to its upper end an indicia cover plate 116. It is now evident that the plate 116 moves longitudinally of the runner pieces 94 with the runner 106, and may revolve with the frame F about the pivot bolt 82. The plate 116 carries a pointer 118 which points to indicia lines 120 laid out on the panel 80 with the bolt 82 as center (see Fig. 2).

These indicia 120 indicate the adjustment of condenser 3 insofar as they indicate the radial position of the integrally movable plate 116, runner 106 and rack 108. It will be noted that the opening 114 is made of such shape and size to accommodate any and all positions of the bearing 110. The plate 116 is made large enough to substantially cover said opening 114 in any position of said plate (Fig. 2).

Referring again to the runner 106 and its integrally formed bearing 110, it may be seen that said runner carries fast thereto a condenser, say aforesaid condenser 12. Bolts 122 hold the condenser to the runner (Figs. 3 and 4). One of these bolts helps hold said rack 108. The condenser 12 may be adjusted by means of a rotatable shaft 124 which passes through said bearing 110 and out above the plate 116 where it is provided with a knob or handle 126 for turning. The turning action of the knob 126 of course adjusts the condenser 12 regardless of the po-

sition of the runner in its guides. A pointer 128 is provided on the knob which points to indicia 130 inscribed in an arc on the plate 116 with the shaft 124 as center. The indicia 130 indicate only the adjustment of condenser 12.

One more independently adjustable condenser remains to be considered. This is the said condenser 52. This condenser 52 is made fast to said panel 80 by spacer bolts 132. Its adjusting shaft 134 has placed fast on its upper end a pinion 136. This pinion meshes with a sector gear 138 bolted to said runners 94 of the frame F. The teeth of the gear 138 are substantially radially cut with the pivot bolt 82 as center. Hence swinging of the frame F rotates the pinion 136 and an independent adjustment of the condenser may be had. The pointer 98 pointing to the indicia 102 along the arcuate slot 100, indicates the adjustment of said condenser 52.

The operation of the control shown in Figs. 3 and 5 is then as follows:

To adjust the condenser 52 independently it is only necessary to grasp the knob 126 and swing the whole frame F on the pivot bolt 82. The condensers 3 and 12 then remain in a given adjustment swinging with the frame.

The plate 116 swings about said center and its pointer 118 does not move from a given indicia line (although it may move along a line) indicating that the condenser 3 is receiving no adjustment. The pointer 128 does not move relatively to its indicia but the pointer 98 does.

To adjust the condenser 3 independently of the others, the knob 126 is grasped and the runner 106 is slid along its guides. Hence, as explained the condenser 3 is adjusted regardless of the position of the frame F. The plate 116 now moves more or less radially across the concentric indicia lines 120 indicating a change in adjustment of the said condenser 3. Now the pointer 98 has been stationary and the pointer 128 remains so relative to its indicia marks.

Next, to adjust the condenser 12 the knob 126 is merely twisted whereupon said condenser is adjusted as described. The pointer 128 moves relatively to its indicia marks 130 on the plate 116.

It is obvious that the described adjustments need not be made consecutively but may be accomplished simultaneously by grasping the one control knob 126 with the fingers and rotate, revolve and slide it all in one movement. An alternate dotted position showing a change in all the condenser adjustments is shown in Fig. 2. At a given time any one, two or three adjustments may be made with one movement of one hand of an operator.

The alternate position of the condenser dials in Fig. 2 shows that the frame F has

been rotated counter-clockwise, the knob 126 has been rotated clockwise and the runner 106 has been drawn down toward the pivot 82 adjustments of the condensers have been made accordingly as hereinbefore described.

In Figs. 2, 6 and 7 are shown means for simultaneously adjusting three coils. The coils here illustrated are of the so-called pancake type, that is, disc shaped. These coils may be cylindrical or of any other shape required in this class of work.

The panel 80 is again employed as well as another opening 114 therein. The openings 114 are alike. The pivot 82 is replaced by a pivot 83 made fast to said panel 80. This pivot 83 (Fig. 7) carries rotatably thereon a body piece 87. The pivot extends down from said piece 87 and carries at the lower end thereof a stationary coil, say coil 2 of Fig. 1.

On the body piece are again formed runner pieces 94 with slots 104 therein. A runner 106 is again provided with a stationary bearing 110 thereon carrying a plate 116 movable with the runner of course. The end piece 96 and pointer 98 are also again provided. Hence we have a frame B formed similar to our said frame F. The accompanying indicia, slot and the like, carry drawing numerals the same as the said parts already described. In short the frame F is repeated in its essentials in this structure.

However the runner 106 carries a different structure. Bolted to said runner 106 are two brackets 142 and 144. The latter bracket 144 carries the movable coil, say 4 of Fig. 1. Hence movement of the runner 106 along its guides causes relative movement of said coils 2 and 4 and a reverse feed back adjustment may be made as indicated in Fig. 1.

Rotation of the frame B on its pivot 83 will not affect the relative positions of said coils as they are radially arranged.

The bracket 142 carries a coil, say 10, of Fig. 1, which is stationary relative to the runner 106. Passing through the bearing 110 is a rotatable shaft 125 which replaces the said rotatable shaft 124 of the said condenser adjustment. At its lower end this shaft 125 carries an arm 146 which has the movable coil, say 14 of Fig. 1. At the upper end of the shaft is carried a knob 126 and accompanying parts identical to those described for the condenser adjustment.

It is obvious that the knob 126 may be turned and movement of the coil 14 accomplished relative to the coil 10.

The coils 48 and 50 of Fig. 1 remain to be taken care of. Coil 48 which is stationary is fastened to a part 81 which is relatively stationary with regard to the panel 80. It may be fastened to the panel, if desired.

Fastened to the frame B by means of an arm or bracket 148 is a coil, say 50 of Fig. 1. This coil obviously is relatively movable with regard to the said coil 48.

Indicia 102, 120 and 130 are provided for the various movable pointers. They are not different from those described for the condenser adjustment.

5 Operation of the coil adjuster is as follows (see Figs. 6 and 7).

Revolution of the knob 126 about the pivot 83 as center causes the frame B to rotate and hence the coil 50 is adjusted with respect to coil 48.

Rotation of the knob 126 on its own center independently adjusts the coils 10 and 14.

Sliding of the knob 126 adjusts the coils 2 and 4.

15 Fig. 2 shows the coil adjustments to be similar to those for the condenser.

It is evident that with the two hands of one operator the six said instruments may be adjusted at once.

20 It is to be understood that one or more of the indicated constructions for a coil adjustment may be applied to the frame which operates a condenser adjustment or two and vice versa. For instance the condenser 52 of Fig. 3 with its gear drive could be replaced by the arm 148 and its accompanying coils 48 and 50 while retaining the adjustments for condensers 3 and 12. Furthermore the triple adjustment might operate a greater number of instruments than so far indicated. For instance, more than one condenser 52 might be operated by the movement of the rack 138. Likewise more than one condenser might be on each of the shafts 124 and 90. 35 The same reasoning applies to the coil adjuster.

It is further to be understood that the particular geared and armed linkages used for operating the condensers and coils herein may be replaced by any other means or they may be interchanged as between the instruments operated thereby, except as limited by the claims.

45 In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As many changes could be made in carrying out the above construction without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrated and not in a limiting sense.

55 I claim:

1. Means for simultaneously adjusting a plurality of instruments comprising a frame pivoted on a center and adapted to relatively move the parts of an instrument by swinging on said center, a slidable member on said frame adapted to relatively move the parts of an instrument mounted on said frame, and a rotatable member on said slidable member adapted to relatively move the parts of an

instrument mounted on said slidable member.

2. Means for adjusting a plurality of instruments comprising a frame pivoted on a center and adapted to relatively move the parts of an instrument by swinging on said center, a slidable member on said frame adapted to relatively move the parts of an instrument mounted on said frame, and a rotatable member on said slidable member adapted to relatively move the parts of an instrument mounted on said slidable member and a handle on said last rotatable member whereby the pivoted, slidable and rotatable members are made operative.

3. Means for adjusting a plurality of instruments comprising a frame pivoted on a center and adapted to relatively move the parts of an instrument by swinging on said center, a slidable member on said frame adapted to relatively move the parts of an instrument mounted on said frame, and a rotatable member on said slidable member adapted to relatively move the parts of an instrument mounted on said slidable member and a handle on said last rotatable member whereby the pivoted, slidable and rotatable members are made operative simultaneously.

4. Means for adjusting a plurality of instruments comprising a frame pivoted on a center and adapted to relatively move the parts of an instrument by swinging on said center, a slidable member on said frame adapted to relatively move the parts of an instrument mounted on said frame, and a rotatable member on said slidable member adapted to relatively move the parts of an instrument mounted on said slidable member and a handle on said last rotatable member whereby the pivoted, slidable and rotatable members are made operative simultaneously or consecutively.

5. Means for simultaneously adjusting instruments comprising a handle, means for adjusting one instrument by revolving the handle about one center, means for adjusting another instrument by moving said handle in a line with respect to said center and means for adjusting a third instrument by rotating said handle on another center.

6. Means for simultaneously adjusting instruments comprising a handle, means for adjusting one instrument by revolving the handle about one center, means for adjusting another instrument by moving said handle in a line with respect to said center and means for adjusting a third instrument by rotating said handle on another center, said last named center being on said line.

7. Means for simultaneously adjusting a plurality of instruments comprising a frame pivoted on a center and adapted to relatively move the parts of an instrument on an outside reference framework by swinging on said center, a slidable member on said frame

adapted to relatively move the parts of an instrument mounted on said frame, and a rotatable member on said slidable member adapted to relatively move the parts of an instrument mounted on said slidable member, indicia on said outside framework adapted to be pointed to by a part of said frame, a device on said slidable member adapted to point to other indicia on said outside framework as the slidable member moves and indicia on said device adapted to be pointed to by a portion of said rotatable member.

8. A simultaneous triple adjustment for radio operation comprising a handle, means to revolve said handle about one center to adjust at least one instrument, means to rotate said handle about another center to adjust at least one other instrument and means adapted to move said handle along a line to adjust at least one other instrument.

9. A simultaneous triple adjustment for radio operation comprising a handle, means to revolve said handle about one center to adjust at least one instrument, means to rotate said handle about another center to adjust at least one other instrument and means adapted to move said handle along a line to adjust at least one other instrument, said line including the last named center.

10. Means for simultaneously adjusting a plurality of instruments comprising a frame pivoted on a center and adapted to relatively move the parts of an instrument by swinging on said center, a slidable member on said frame adapted to relatively move the parts of an instrument mounted on said frame, and a rotatable member on said slidable member adapted to relatively move the parts of an instrument mounted on said slidable member.

11. In radio apparatus, more than two adjustable tuning units, and a single actuator constantly connected with all the units and operable by different movements thereof to selectively adjust the units collectively and individually, and by a combination of the different movements thereof to adjust the units collectively in variable ratio.

12. In radio apparatus, more than two adjustable tuning units, and an actuator constantly connected with all the units, said actuator being inclusive of a single operating knob or handle and being operable solely through said single knob or handle to adjust said units individually.

13. In radio apparatus, more than two adjustable tuning units, and an actuator constantly connected with all the units, said actuator being inclusive of a single operating knob or handle and being operable solely through said single operating knob or handle to adjust at least two of the units individually and also to adjust all the units collectively.

14. In radio apparatus, more than two adjustable tuning units, and an actuator con-

stantly connected with all the units, said actuator being inclusive of a single operating knob or handle and being operable solely through said single operating knob or handle to selectively adjust said units collectively and individually.

In testimony whereof, I have signed my name to this specification this 20th day of July, 1925.

LLOYD Q. SLOCUMB. 75

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