Nov. 30, 1937. F. A. MITCHELL 2,100,609

CONTROL MEANS

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Fig. 1

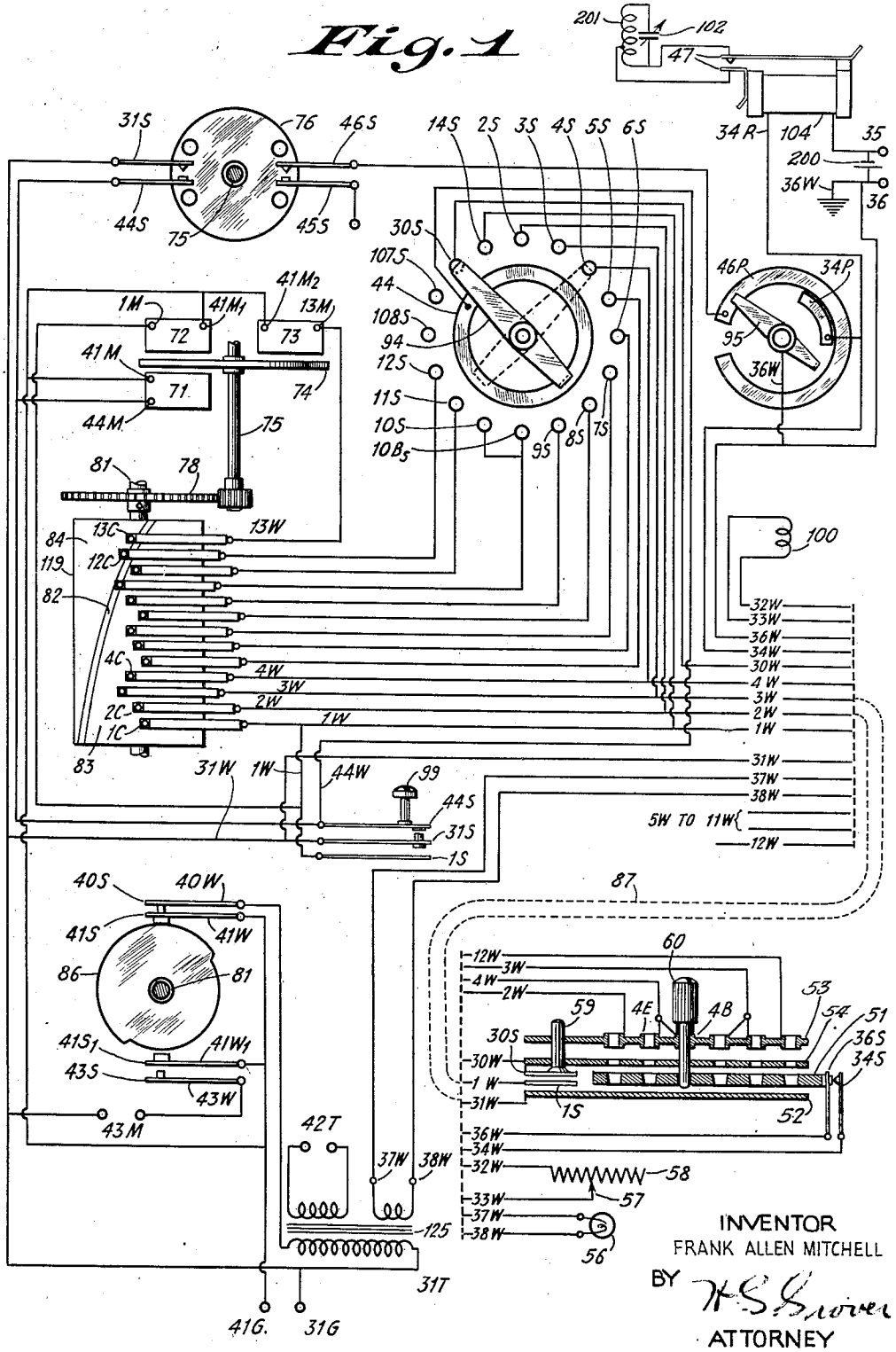

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Fig. 2

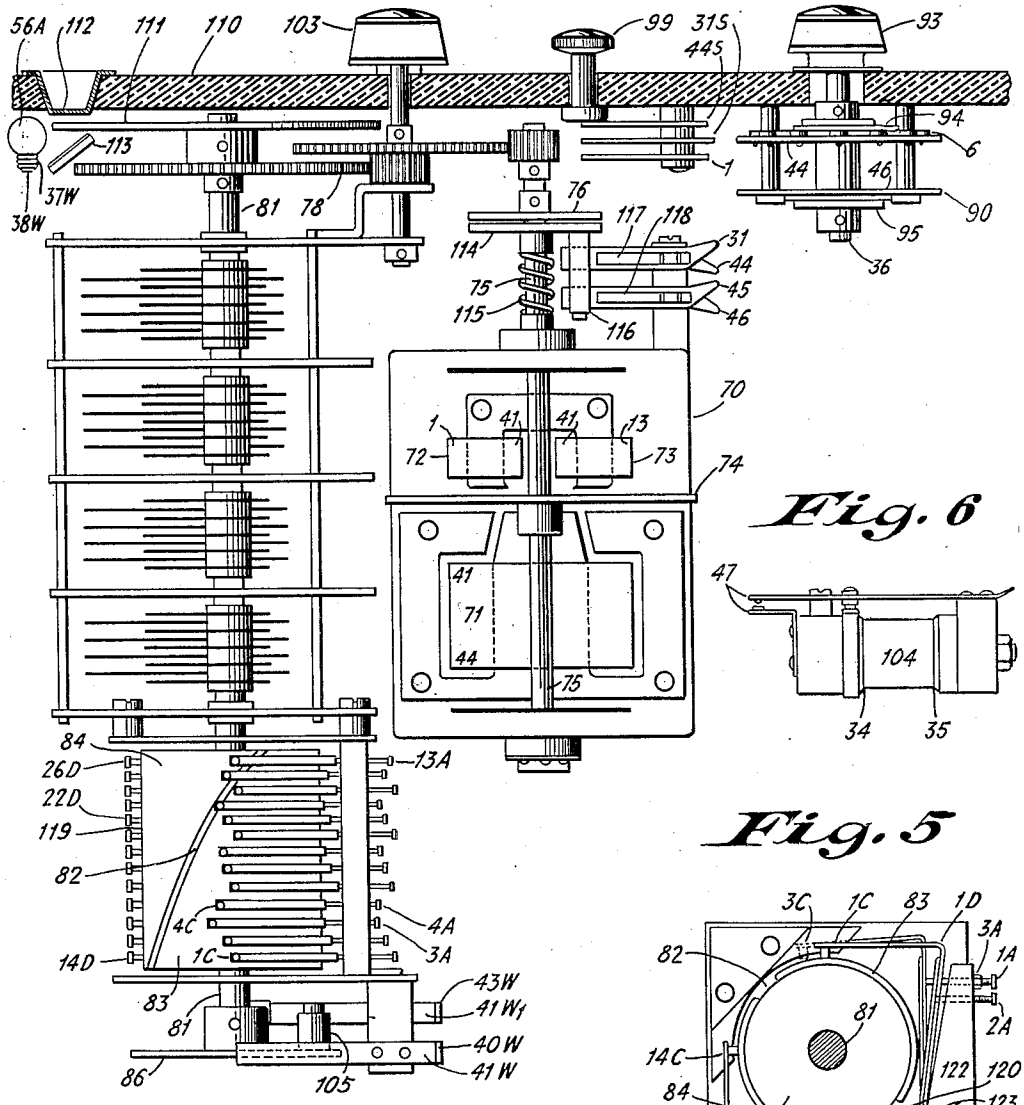


Fig. 6

Fig. 5

Fig. 3

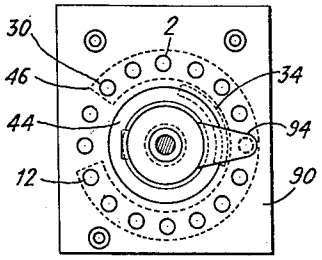
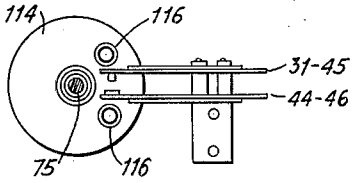


Fig. 4



INVENTOR
FRANK ALLEN MITCHELL
BY H. S. Grover
ATTORNEY

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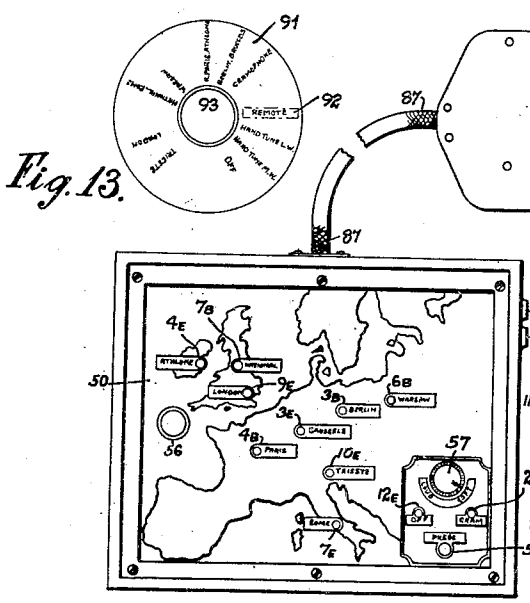

Fig. 13.

Fig. 8.

Fig. 12.

Fig. 16.

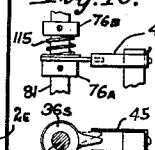

Fig. 17.

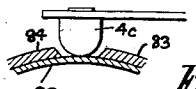

Fig. 14.

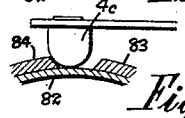

Fig. 15.

Fig. 7.

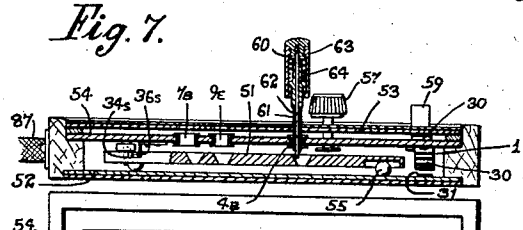

Fig. 10.

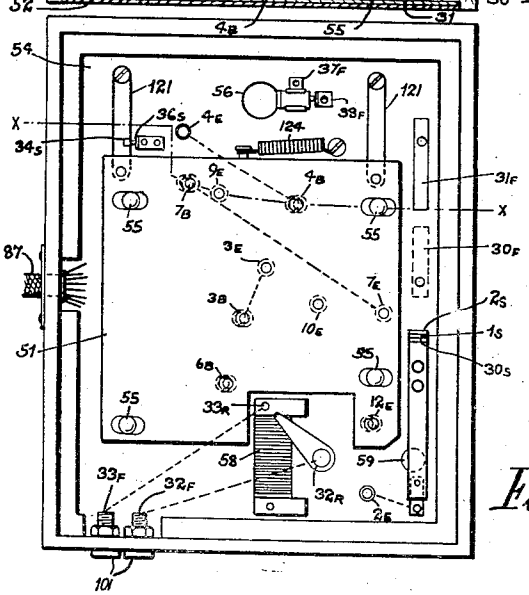

Fig. 9.

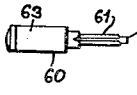

Fig. 11.

INVENTOR
FRANK ALLEN MITCHELL
BY. H. C. Garver
ATTORNEY

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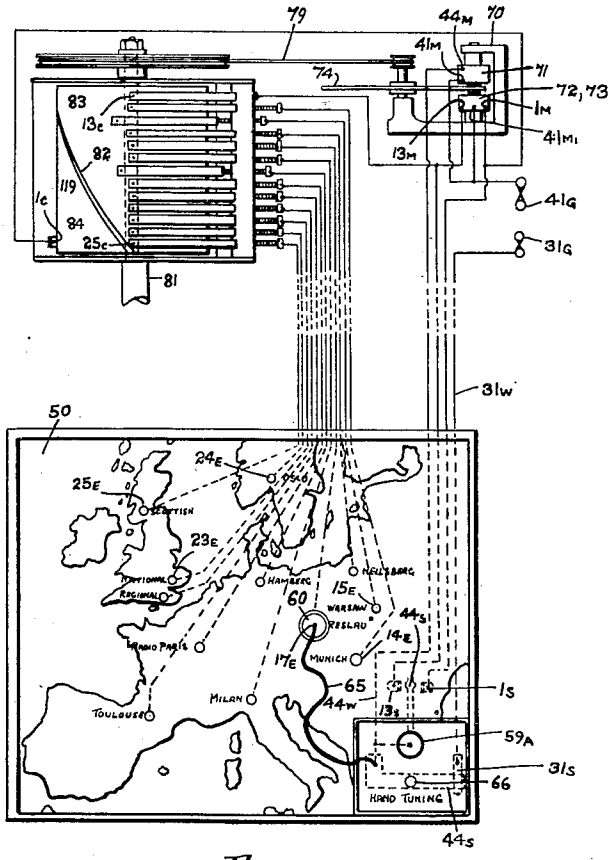

Fig. 18.

INVENTOR
FRANK ALLEN MITCHELL
BY
ATTORNEY

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2,100,609

UNITED STATES PATENT OFFICE

2,100,609

CONTROL MEANS

Frank Allen Mitchell, London, England, assignor to Electric and Musical Industries Limited, Hayes, Middlesex, England, a company of Great Britain

Application March 13, 1934, Serial No. 715,266
In Great Britain March 14, 1933

9 Claims. (Cl. 250—20)

The present invention relates to means for controlling and indicating the setting of apparatus for modulated carrier wave reception such, for example, as wireless receivers and provides new or improved means whereby the setting of the apparatus may be controlled and indicated either at the apparatus or from a position remote from the apparatus.

In connection with the steering of ships and for other purposes it has been proposed to make use of a drum having a conducting surface divided into two relatively insulated parts along helical lines. A number of fixed contacts are arranged in contact with the drum surface and the drum is mechanically coupled to an electric motor and a driven member such as the rudder of a ship. The arrangement is such that when the circuit of one of the fixed contacts is closed at a remote point, provided that this contact is resting against a conducting part of the drum surface, the motor will start to rotate and will be stopped automatically when the contact reaches the insulating zone separating the conducting zones on the drum surface. The motor has been arranged to rotate in one direction when contact is made with one of the two conducting surfaces of the drum and in the opposite direction when contact is made with the other conducting surface. Such an arrangement is not suitable for use in connection with the tuning of wireless receivers because it is capable of adjustment to only a certain number of fixed positions determined by the positions of the contacts which have hitherto been arranged along a line parallel to the drum axis. For tuning a wireless receiver to any one of a number of stations it is necessary that the various tuning positions which can be selected should be adjustable with considerable exactitude.

According to the present invention, therefore, there are provided means for effecting the adjustment of a tuning component of a wireless receiver, said means comprising a driving member having said component and a movable electrical contact breaking device both mechanically coupled thereto, the contact breaking device being adapted, during contact between the greater part of a surface thereof and a contacting member, to cause or permit motion of the driving member and, during contact between said contacting member and a zone of said surface, to prevent or interrupt said motion, said zone running in a direction or in directions inclined at an acute angle with respect to the direction of motion thereof, characterized in that said contacting member is so mounted as to be adjustable in position for the purpose of varying the position of the contact breaking device at which contact is made between said contacting member and said insulating zone.

According to a feature of the present invention it is arranged that appreciable movement of the contact breaking device can take place whilst the contacting member is in contact with the insulating zone and means are provided whereby the contact breaking device can be caused to take up a position substantially at one edge of the insulating zone.

Other features of the present invention will appear from the following description and the appended claims.

The invention is illustrated by way of example in the accompanying drawings in which—

Fig. 1 is a diagram showing the circuit connections between the various components of remote control apparatus according to the present invention,

Fig. 2 is a view in elevation showing mechanism for automatically tuning a radio set using the circuit arrangements of Fig. 1,

Fig. 3 is a plan view of a manual control switch shown in Fig. 2 which may be provided upon the wireless receiver itself to enable the way in which the receiver can be used to be adjusted,

Figs. 4 and 5 are end views of details shown in Fig. 2,

Fig. 6 shows a detail which appears diagrammatically in Fig. 1,

Fig. 7 is a plan view of a station selector, of the kind shown in Fig. 1, in the form of a map of Europe,

Fig. 8 shows a connecting device whereby the station selector of Fig. 7 can be connected to the automatic tuning mechanism of Fig. 2,

Fig. 9 is an underside view of the map shown in Fig. 7,

Fig. 10 is a section of Fig. 9 on the line x—x,

Fig. 11 shows a selector plug which may be used with the map of Fig. 7 or the panel of Fig. 12,

Fig. 12 is a plan view of an alternative station selector in the form of a plain panel,

Fig. 13 is a plan view of a form of dial which may be used with the manual control switch shown in Fig. 3,

Figs. 14 and 15 are detail views illustrating the operation of fine tuning,

Figs. 16 and 17 show in plan and elevation respectively an alternative arrangement to that of Fig. 4, and

Fig. 18 shows a simplified form of mechanism for automatic station finding according to this invention.

Like parts in the various figures are given the same references and for making clearer the relationship between the various figures, points on different pieces of apparatus which are electrically connected together and the wire connecting these points are in many cases given the same numeral reference with a different alphabetical suffix.

Referring now to Figs. 1 to 11 and, in the first place, more particularly Fig. 2, beneath the panel 110 of a combined wireless receiver and talking machine is mounted a four gang variable condenser 102 which is adapted in known manner to tune the various circuits of the receiver to a desired wavelength. The condenser shaft 81 carries a toothed wheel 78 meshing with a pinion upon the shaft of a knob 103 whereby the receiver can be tuned manually. The setting of the condenser can be read upon a translucent scale 111 through window 112. The scale is illuminated by means of an electric bulb 56A with the aid of a mirror 113. Geared to the shaft of the control knob 103, and hence to the condenser shaft 81, is an electrical motor 70 of the induction disc type comprising an induction disc 74 carried upon the motor shaft 75. This motor is of known type and has a current coil 71 and two potential coils 72 and 73.

Above the motor there is fixed to the motor shaft 75 a disc 76. A second disc 114 is rotatably mounted on the shaft 75 and is pressed into frictional engagement with the discs 76 by means of a spring 115. As will be seen from Fig. 4 the disc 114 carries two pins 116. When the motor is rotating the friction between the discs 76 and 114 is sufficient to cause one of the pins 116 (according to the direction of rotation) to close the two switches 117 and 118 but the switches automatically open when the motor is no longer energized. The purpose of the switches 117 and 118 will be described later.

To the lower end of the condenser shaft 81 is fixed a drum 119 acting as the movable member of a contact breaking selector device which is also shown in underside plan or end view in Fig. 5. The drum is of insulating material and has two conducting surfaces 83 and 84 thereon. These surfaces are separated from one another along two zones 82 and 120, the zone 82 being inclined at an acute angle to the direction of motion of the drum surface, in this case it is of approximately helical shape. The zone 120 may be helical or parallel to the drum axis. The zone 82 is arranged to extend around about one quarter of the periphery of the drum.

Two sets of contacts are provided, one set being designated by the references 1C to 13C and the other set by references 14C to 26C. Only certain of these references, for example 4C, are for clearness marked on the drawings. The same numerals with different suffixes are used on the drawings to designate points electrically connected with the respective contacts. Each contact is carried by a spring blade such as 1D anchored to an insulating support 122 by suitable screws 123 (see Fig. 5). The position of each contact around the drum axis can be adjusted within limits by means of adjusting screws of which four only are indicated in Figs. 2 and 5 at 3A, 4A, 13A and 14A. The screws are, as shown in Fig. 5, staggered to facilitate their adjustment. Suitable lock nuts may be provided for securing the adjusting screws in position after they have been set as required.

To the lower end of the shaft 81 is fixed a cam disc 86 co-operating with switch contact blades 40W and 41W (seen better in Fig. 1). A pin 105 projecting from the cam disc 86 co-operates with switch contact blades $41W_1$ and 43W. In Fig. 1 the mechanism is represented diagrammatically as a simple cam. The arrangement is such that contacts 40S and 41S remain closed excepting at one extreme position of the variable condenser 102 and that contacts $41S_1$ and 43S remain open excepting at the opposite extreme position of the condenser.

On the panel 110 is a button 99 serving to operate a switch and a control knob 93 operating switch mechanism also shown in Fig. 3, the view of Fig. 3 being a plan view with the knob 93 and panel 110 removed. The functions of these switches will be described later with reference to Fig. 1 where they are shown diagrammatically.

Turning now to Figs. 7 to 11, there is shown in Fig. 7 a plan view of one form of selector panel 50 which can be used with the apparatus above described. This panel can, if desired, be mounted upon the cabinet of the radio receiver or as shown it can be located at a remote point and connected to the receiver by means of a multi-core flexible cable 87. For this purpose there is shown in Fig. 8 a multi-pin plug member 88 which can be plugged into a corresponding socket member 89 fixed at any convenient place upon the radio receiver. The numerals appearing against the various contact plugs and sockets indicate the points in the apparatus to which they are connected.

The panel 50 of Fig. 7 is in the form of a map of Europe having at points thereon holes corresponding to the localities of transmitters from which it may be desired to receive. Each hole is provided with a metallic eyelet or socket which is connected to an appropriate contact 4C, 5C, etc. of the selector drum and accordingly each hole is indicated by a numeral corresponding to the particular selector drum contact to which it is connected, in most cases together with the suffix E. It will be noticed that certain of the holes are designated with a numeral having the suffix B. Such holes correspond to long wave transmitting stations, and in a manner to be described later, can in some cases make use of the same drum contact as a particular medium wave station. The sockets indicated by the same numeral, for example 7E and 7B, are therefore connected together.

On the selector panel is a pilot lamp 56, a volume control knob 57, a press button 59 and two additional sockets marked "Off" and "Gram" respectively, the functions of which will be described later. The numerals against these additional sockets also indicate the points to which they are connected.

Fig. 9 is an underside view of the selector panel of Fig. 7 with the base removed and Fig. 10 is a sectional view along the line x—x of Fig. 9. The selector panel comprises an upper metal plate 53 which bears the representation of the map. This may for example be embossed. Beneath the plate 53 is fixed an insulating plate 54 having eyelets marked 7E, 7B, etc., as already described according to the selector contacts to which they are connected. The bottom of the panel is constituted by a metal plate 52 which, however, may be covered externally by insulating means since in operation it is at mains poten-

tial. Between the plates 52 and 54 is arranged an insulating member 51 which acts as a wave change member in a manner to be described. This member 51 is mounted upon four balls 55 arranged in suitable recesses in the underside of the member 51 and resting upon the base plate 52. The member 51 is also restrained by pivot arms 121 so as to be capable only of lateral movement. It is held in one direction by a spring 124 and in this end position the switch constituted by contacts 34S and 36S is closed. The connecting point to the upper metal plate 53 is indicated by 30F and that to the base plate 52 by reference 31F. The switch contacts actuated by button 59 are indicated by 2S, 1S and 30S, respectively. A rheostat 58 is controlled by the knob 57 and acts as a loudspeaker volume control. Its terminals are indicated by 32R and 33R.

As will be seen in Figs. 10 and 11, there is provided a selector plug 60 having an outer insulating casing 63 having fixed within it a central pin 62. Over this pin is arranged a sleeve 61 which is slidable thereon. The sleeve is urged into its lowermost position by a spring 64. The lower part of the sleeve 61 is split longitudinally to make it yielding. When the selector plug 60 is inserted into one of the holes of the panel, for example hole 4B as in Fig. 10, the sleeve 61 first makes contact between the upper plate 53 and the socket 4B. On further insertion it engages the side of a countersunk hole in the insulating plate 51, because this hole is not exactly aligned with the hole 4B, and forces the plate 51 to the left thus opening switch 34S, 36S. This as will appear later has the effect of changing the condition of the receiver from that adapted for medium wave reception to that for long wave reception. The sleeve 61 cannot now be pushed further because of a shoulder thereon engaging the upper plate 53 and consequently further pressure upon the plug casing 63 causes the central pin 62 to move downward, against the action of the spring 64, and make contact with the base plate 52. When pressure upon the plug casing 63 ceases, the pin 62 recedes and breaks contact with the plate 52. The same action will take place when the plug is inserted into any hole marked with the suffix B, that is a hole corresponding to a long wave station. The holes corresponding to short wave stations and bearing the suffix E are however aligned with the holes in the plate 51 and when the plug is inserted into one of these the switch contacts 34S, 36S remain closed.

The most important electrical connections will be seen in the circuit diagram of Fig. 1. Here the wires or like conductors connecting two points are given the same numeral reference as the points connected together with the suffix W.

The mains terminals 41G and 31 are connected to a suitable alternating current source and so long as contacts 40S, 41S remain closed (that is excepting at one extreme position of the variable tuning condenser) the primary of the transformer 125 is energized. The terminals 42T of one secondary winding are connected to the radio receiver to provide the necessary power for operation. The other secondary winding has its terminals 37T, 38T connected to the pilot lamps 56 (upon the selector panel) and 56A (upon the receiver panel). These lamps indicate when the set is in operation.

Certain of the components already described are shown diagrammatically and somewhat differently in Fig. 1 for the sake of clearness. For example only one bank of contacts 1C to 13C are shown and the operation of the apparatus is described for clearness as if only this set were provided. Further the two switch devices with contact arms 94 and 95 shown in Fig. 1 are actually superimposed and operated by the single knob 93 in Fig. 2. The switch arm 94 serves to make contact between the ring 44 and one or other of the studs 30S, 14S, etc. The switch arm 95 makes contact with one end on the broken ring 46P and with its other end on segment 34P.

The circuit arrangement will be best understood by a description of certain examples of its mode of operation. The knob 93 (Fig. 2) will be assumed to be so set that arms 94 and 95 in Fig. 1 are in the positions shown. In Fig. 13 is shown a dial which may be associated with the knob 93 and with the setting above mentioned the word Remote may appear in the dial window 92 indicating that the receiver is set for operation from a remote point by means of the selector panel.

It will be assumed further that it is desired to receive from Paris, a long-wave station. The selector plug 60 is therefore inserted in hole 4B in the selector panel as shown in Fig. 1. The first effect of inserting the plug is to connect top plate 53 (shown beneath the member 54 in Fig. 1) with the socket 4B. Further it will cause the plate 51 to move sideways and open contacts 34S and 36S as shown. Finally contact will be made between socket 4B and base plate 52. It will be noted that the motor coil terminals 41M, $41M_1$ and $41M_2$ are permanently connected to the mains terminal 41G. The other mains terminal 31G is permanently connected to base plate 52 by wire 31W. After the plug has been inserted and whilst it is pressed into contact with base plate 52, a circuit can be traced from the base plate 52 (at mains potential) on the one hand through plate 54 by wire 30W, switch contact 30S to contact ring 44 and thence to terminal 44M of the current coil 71, thus energizing the current coil. On the other hand a circuit can be traced from plate 52 through socket 4B, by wire 4W, drum contact 4C, conducting drum surface 83, contact 1C through wire 1W to the terminal 1M of potential coil 72, thus also completing the circuit through the potential coil 72. It is arranged that for all working positions of the drum 119, the contact 13C remains in contact with surface 84 and contact 1C remains in contact with surface 83. The effect of energizing coils 71 and 72 of the motor is to make the motor start up and run in such a direction that the upper surface of the drum 119 moves to the right in Fig. 1. The effect of energizing coils 71 and 73 on the other hand is to make the drum move in the opposite direction.

For the moment it will be assumed that pressure on the selector plug 60 is maintained. The drum will rotate until contact 4C comes to rest upon the insulating zone 82 when the circuit of coil 72 is interrupted. Current will still flow through the coil 71 but nevertheless the motor will stop. If the drum should overshoot so that contact 4C came to rest upon the drum surface 84, the circuit of coil 73 would be closed and the drum would move back until the contact came to rest upon the insulating zone 82.

Now the contact 4C has previously been so adjusted that when the drum 119 is in such a position that the contact 4C rests on the insulating zone 82, the condenser tunes the receiver approximately to the wavelength of Paris.

It is, however, undesirable that pressure should have to be maintained upon the selector plug 60 whilst the station is being selected. On the other hand it is also undesirable that the current coil 71 should remain energized whilst the set is in operation, as would be the case were the selector plug designed to make permanent connection with the plate 52 when inserted. To overcome both these difficulties there is provided the friction clutch device 76, 114 already described in connection with Fig. 2. In Fig. 1 the essential part of this clutch device is depicted diagrammatically, 75 representing the motor shaft and 76 the disc frictionally coupled thereto. For the sake of clearness the two switches operated by the friction disc 76 are shown upon opposite sides thereof. When the motor commences to rotate, owing to momentary contact between the central pin of the selector plug and the base plate 52, the friction disc 76 is carried around until both the switches 31S, 44S and 45S, 46S are closed and then slips upon the shaft 75. These contacts remain closed so long as the motor coils are energized but automatically open, owing to the spring blades of these contacts, when the coils cease to be energized. The effect of the closure of contacts 31S, 44S is to override the contact between the selector plug 60 and the plate 52 and to maintain connection between plates 52 and 53. Thus it is only necessary to press the selector plug 60 down momentarily so that the coils 71 and 72 are energized and the motor commences to move. Thereafter the coils are kept energized by switch 31S, 44S. The switches 31S, 44S and 45S, 46S are closed irrespective of the direction of the motor. Thus if when the selector plug was inserted the contact 4C had been resting on surface 84 the motor would have run in the opposite direction but the switches would still be closed. When the contact 4B comes to rest upon the insulating zone 82, the circuit of the coil 72 is interrupted, the motor comes to rest and switch 31S, 44S opens thereby interrupting the circuit of coil 71.

The switch 46S, 45S serves to "mute" the receiver (that is to render it inoperative and silent) during the operation of tuning. This may be done by connecting contact 45S to a suitable point on the receiver which is then earthed, through 46S, 46P, switch arm 95 and wire 36W, whilst the motor is rotating and open circuited again when the motor comes to rest (and when the receiver is therefore tuned to the desired station). The receiver can be muted in any convenient manner, for example by short-circuiting the H. F. or L. F. amplifiers or loudspeaker.

It has been found highly desirable to arrange ample clearance between the contacts 4C etc. and the edges of the conducting drum surfaces 83 and 84 when the contacts are resting upon the insulating zone 82. The preferred form of the contacts and the groove constituting the insulating zone can best be seen from the enlarged view of Fig. 14. Unless this ample clearance is provided arcing is likely to take place and to upset completely the operation of the device. It is not possible, however, to provide such ample clearance and at the same time to ensure that stations are sufficiently accurately tuned in wherever the contact may come to rest in the groove unless a relatively large drum be used. In practice it has not been found convenient to provide drums of sufficient size to satisfy these requirements. There is accordingly provided, upon the selector panel, a fine tuning button 59. When the desired station has been approximately tuned in by the insertion of the selector plug 60 and after the motor has come to rest with the contact such as 4C somewhere in the groove of the insulating zone, the button 59 is pressed. The effect of this is to join wires 1W and 30W to wire 31W and therefore to the mains terminal 31G thus energizing coils 71 and 72 and causing the motor to move the top of the drum 119 to the right in Fig. 1. As soon as the contact 4C makes contact with the edge of surface 84, as shown in Fig. 15, the coil 73 is also energized owing to terminal 13M being connected to mains terminal 31G through contact 13C, drum surface 84, contact 4C, wire 4W, socket 4B, plate 53, switch blades 30S and 1S1 and plate 52. Thus the current coil 71 and both potential coils 72 and 73 are energized, the motor has an equal tendency to rotate in opposite directions and it consequently comes to rest with the contact 4C resting just against the edge of surface 84. Since the correct tuning position is obtained when the contact rests against the edge of the groove, the desired station can be accurately tuned in.

The rheostat 58 with its control 57 serve to control the volume of sound emitted by the loudspeaker of the receiver. In the example illustrated volume control is effected by arranging the resistance 58 in parallel with the moving coil 100 of the loudspeaker which itself is not illustrated. As shown in Fig. 9 terminals 101 may be provided upon the selector panel so that a loudspeaker may be plugged in there if desired.

If the selector plug 60 be plugged into a medium wave hole in the panel, the action of the apparatus is similar to that above described excepting that the member 51 is not displaced and consequently the switch 34S, 36S is closed. The effect of this is to connect a suitable source of current 200 connected to terminals 35, 36, across a relay 104 which is shown in more detail in Fig. 6. The relay contacts 47 are thus closed and in this position short circuit a part of a high frequency tuning coil 201 in the receiver. This coil is then tuned by the variable condenser 102 to a medium wave station. Clearly any desired number of contacts 47 can be operated by the relay 104 so that any desired number of coils in the receiver can be controlled simultaneously. It is because of this action of the switch 34S, 36S that it is possible to arrange that one wire such as 4W for example, serves to control the selection of both a long and a short wave station.

When the selector plug 60 is plugged into hole 2E, marked "Gram" on the selector panel, contact 2C is energized and the drum 119 rotates until this contact comes into the groove 82. In this extreme drum position the switch cam 86 closes contacts 41S1, 43S, (keeping contacts 40S, 41S closed also) and thus energizes the talking machine motor (not shown) which is connected to terminals 43M. The switch 41S1, 43S, or other switches operated similarly by the cam 86 can be arranged also to connect the "pick-up" device, instead of the high frequency amplifier, to the low frequency amplifier of the receiver. It can also be arranged that the button 59 on the selector panel, under these circumstances, serves when pressed to initiate a change of record, if the talking machine is of a suitable magazine type.

When the selector plug 60 is plugged into hole 12E, marked "Off", contact 12C is energized and the drum 119 rotates into its other extreme position. In this position both switches 40S, 41S and 41S1, 43S are open. The opening of the

former switch serves to cut off the mains from the receiver.

The purpose of the switch device controlled by knob 93 on the receiver is not only to permit the apparatus to be set, at will, either for remote operation or for operation at the receiver but also to permit automatic selection of certain stations from the receiver itself. When the switch arm 94 is turned away from stud 30S, the selector panel is disconnected from the receiver. If the arm 94 be moved to stud 4S the same effect is produced as by inserting the selector plug 60 into the hole 4E in the selector panel in the previous example. In all settings such that the selector arm 95 is out of contact with segment 34P, the stations selected are long wave stations. When contact is made with segment 34P the relay 104 is operated and the stations selected are medium wave stations. When the arms 94 and 95 are so set that arm 94 is on stud 107S, the receiver can be tuned manually to any desired long wave station by manipulating knob 103 in the usual way. When the stud 108S is engaged by arm 94 the receiver can be tuned manually to a desired medium wave station because in this position arm 95 is in contact with segment 34P. By turning the switch on to stud 12S the receiver is switched off. The fact that the relay 104 is energized in this position is not material if the supply of current connected to terminals 35, 36 is derived from the mains transformer 12S.

It will be noted that when hand tuning the muting switch 45S, 46S is not operative to mute the receiver because arm 95 is then out of contact with ring 46P. If desired, however, the muting switch may be made operative when hand tuning so long as the tuning knob is being rotated by any considerable amount. It can be arranged that small movements of the knob 103 can be carried out, however, for fine tuning without operating the muting switch.

The button 99 provided upon the receiver panel 110 serves the same purpose as button 59 on the selector panel, as will be seen from Fig. 1.

In the arrangement of Fig. 1 only one bank of contacts 1C—12C is shown co-operating with the drum 119. With such an arrangement in order to utilize the full tuning range of the condenser 102, namely 180°, the groove 82 must run rather more than half way around the periphery of the drum. Where it is desired to select from a relatively large number of stations it may not be convenient to arrange all the necessary contacts in one row and a plurality of rows can then be provided. In Fig. 2, two such rows are shown and the groove 82 should then extend around rather more than a quarter of the periphery of the drum.

In Fig. 12 is shown an alternative form which the remote control panel may take. Here the holes 4E, 3B etc. in the panel 50A are arranged in columns with the appropriate station names marked against them. The selector panel may of course take a great variety of other forms.

Figs. 16 and 17 illustrate a form of muting switch alternative to that shown in Fig. 4. The two members 76A and 76B are fixed to the condenser shaft 81. A contact member 36S is rotatably mounted on the shaft 81 and is held in frictional engagement with the member 76A by means of a spring 115. A contact member 45 of approximately U-shape is provided and when the condenser shaft is rotated, the member 36S makes contact with one or other limb of the member 45, thereby earthing the latter member.

A simplified embodiment of the present invention is shown in Figure 18. In this example no provision is made at the remote point for switching the receiver on and off, for changing the wavelength range or for switching the receiver over to the talking machine condition.

The connections are as shown in the drawings, terminals 31G and 41G being connected to a suitable A. C. source. A belt or cord drive 79 is shown between the motor 70 and the condenser shaft 81 carrying the drum 119. The selector plug 60 is in this case a simple wander plug and is connected by a short length of flexible cable to wire 44W. The effect of inserting the plug 60 into any desired hole, for example 17E, is to connect wire 44W through contact 17C and either contact 13C or 1C, according to the position of the drum, to motor terminal 13M or 1M. Since motor terminals $41M_1$ and 41M are connected to mains terminal 41G and since wire 44W is connected through contacts 44S and 31S to mains terminal 31G, the current coil 71 and one half of the potential coil 72, 73 are energized. The drum is consequently rotated until the contact 17C reaches the insulating zone 82. For fine tuning there is provided a knob 59A whereby wire 44W can be connected through switch contact 44S either through contact 13S to motor terminal 13M or through contact 1S to motor terminal 1M. The drum is thus rotated in one direction or the other so that fine tuning can be carried out. When the plug 60 is inserted in hole 66, the switch contact 44S is moved out of contact with contact 31S and the set can be tuned by hand in the usual way.

A great many variations can be made in the embodiments of the invention above described without departing from the scope of the invention as defined in the appended claims. For example the commutator drum 119 may be replaced by a disc comprising two conducting portions separated by an insulating zone. The motor need not necessarily be of the induction disc type. In some cases it need not be reversible although it is preferably so. If the motor is not reversible, only one insulating zone is provided on the commutator and the commutator always rotates in the same sense. It comes to rest when the appropriate contact comes to rest on the insulating zone.

The present invention can of course be applied to the reception of television and other signals whether these signals be transmitted by radio or in the form of modulated carrier oscillations along a line.

I claim:

1. A tuning control means comprising a rotor shaft, a frame provided with insulation members, a drum secured to said rotor shaft and mounted in said frame, said drum having a conducting surface divided into two insulated parts by insulating zones, one of said zones being a spiral, a plurality of contacting members adapted to make contact with the surface of the drum mounted on said insulation members and arranged with their contact points lying approximately in a plane parallel to the drum axis and screw means threaded into said insulation members and engaging intermediate portions of said contacting members for lateral adjustment thereof.

2. In a control device for a tuning reactor, a drum connected to said reactor, said drum comprising only two cylindrical shaped metallic members, two spirally shaped insulation zones

separating said members with the spirals lying at acute angles with reference to the direction of motion of said drum, a plurality of contact members resiliently engaging said drum and screw means engaging the rear of said contact members to flex them transversely of said drum and adjust each of said contact members independently.

3. The combination defined in the preceding claim in which each of said insulation zones extends through an angle of at least 90° about the axis of said drum.

4. In combination a radio receiver including a high frequency amplifier, means for tuning said amplifier to a desired signal frequency, an electric motor having a drive shaft, a friction clutch including a flat disc secured to said shaft and connected to said tuning means, means for energizing said motor, a circuit connected to short circuit said amplifier and including a switch, a second disc loosely mounted on said shaft adjacent said flat disc, a spring pressing said second disc into engagement with said flat disc and a member projecting from said second disc and arranged to close said switch when said motor shaft is rotated by said energizing means.

5. In combination, a radio receiver comprising a tunable circuit including a coil and a variable rotary condenser, an electric motor connected to said condenser, a circuit for energizing said motor including a switch located at a point remote from said receiver and means located at said remote point connected to short circuit a portion of said coil said means being operatively connected with said switch.

6. In combination a radio receiver comprising a tunable circuit including a coil and a variable rotary condenser, an electric motor, a circuit for energizing said motor including a plate having a plurality of apertures therein, a second plate mounted adjacent said first plate, a plug adapted to pass through said apertures and move said second plate, switch means operable in response to movement of said second plate and a circuit connected to short circuit a portion of said coil under control of said switch means.

7. In combination a rotary tuning control device, an induction motor connected to said device and having a current coil and two potential coils, a circuit connected to energize said current coil and one only of said potential coils to thereby cause rotation of said motor and a switching means mechanically connected to said tuning control device arranged to energize the other of said potential coils additionally to said current coil and said one potential coil and thereby cause operation of said motor to cease and a cam connected to said control device and arranged to open said circuit in response to movement of said control device to its extreme position.

8. In combination, a radio receiver comprising a tunable circuit including a coil and a variable rotary condenser, an electric motor connected to said condenser, a circuit for energizing said motor including a first switch, said switch comprising two separated metallic plates one of said plates having apertures therein, a plug of good conducting material adapted to be fitted into said apertures and to connect said plates, a second switch located near said plug, a member mounted between said plates and arranged to be moved sidewise by movement of said plug to operate said second switch, and a circuit including said second switch arranged to cause a portion of said coil to be short circuited.

9. In combination, a radio receiver comprising a tunable circuit including a coil and a variable rotary condenser, an electric motor, a circuit for energizing said motor including a plate having a plurality of apertures therein, a second plate movably mounted below said first plate and having at least one aperture therein in alignment with an aperture in said first plate and a second aperture slightly out of alignment with the other aperture in said first plate, a plug adapted to be inserted through either aperture in said first plate and to move said second plate sidewise when inserted into the second aperture therein, switch means operable in response to movement of said second plate and a circuit connected to short circuit a portion of said coil under control of said switch means.

FRANK ALLEN MITCHELL.