

July 5, 1932.

F. L. MORSE

1,865,537

RADIO CONTROL DEVICE

Filed June 2, 1925

2 Sheets-Sheet 1

Fig. 1.

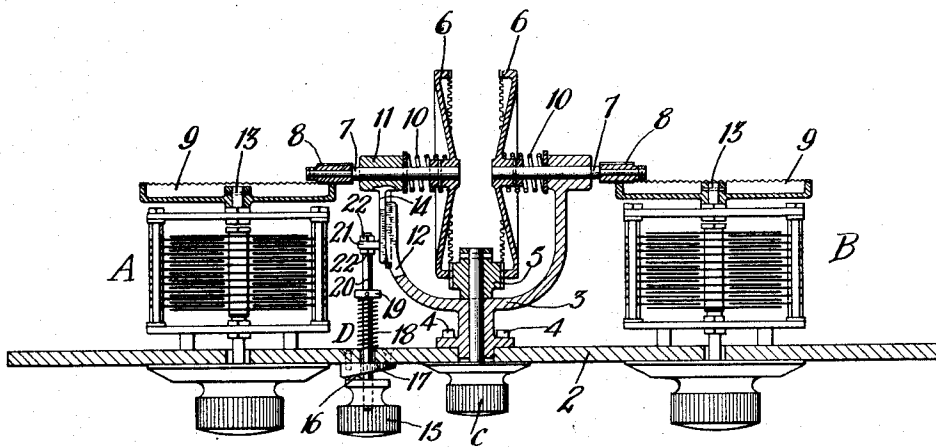


Fig. 3.

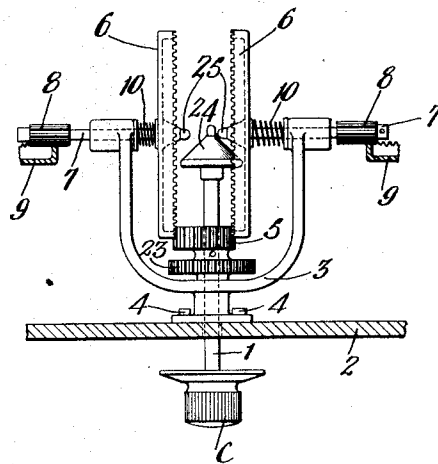
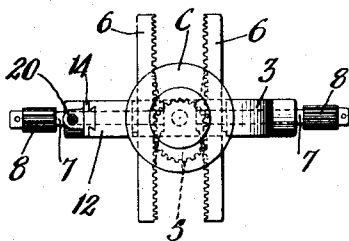


Fig. 4.



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2 Sheets-Sheet 2

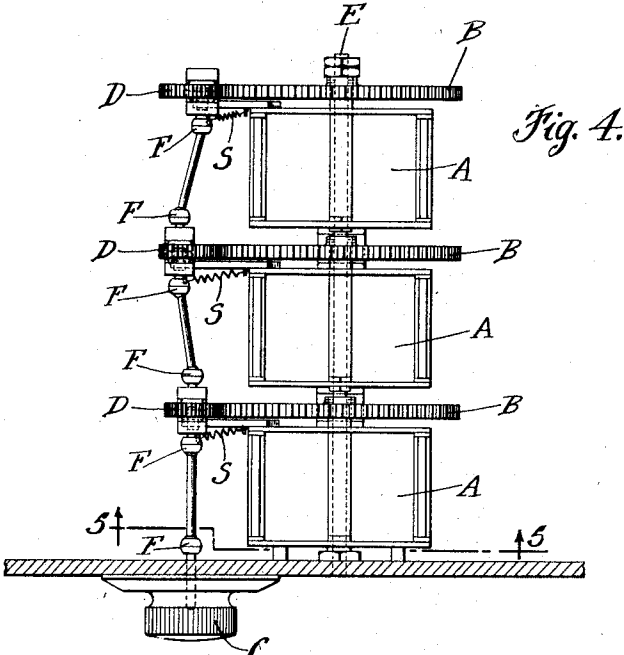


Fig. 4.

Fig. 5.

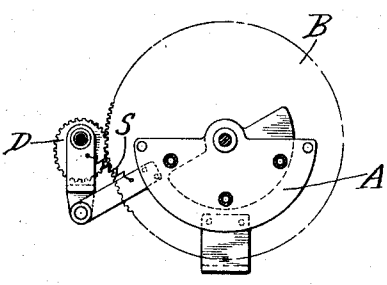
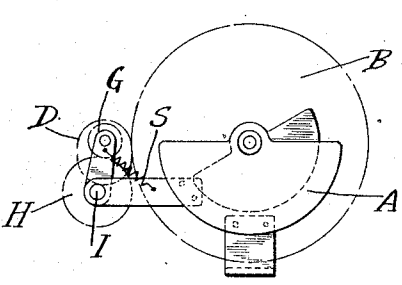


Fig. 6.



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RADIO CONTROL DEVICE

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This invention relates to controlling or tuning of radio apparatus and is particularly applicable to receiving apparatus where it is desirable to have several instruments under one control for simplified and more effective tuning.

Amongst the primary objects of my invention are the following:

1st. The provision of a single control for several tuning elements.

2nd. The provision of a control which will impart a relative oscillatory movement between several tuning elements. This method of control is particularly advantageous in connection with certain circuits, as, for example, the superheterodyne. In this circuit there are two primary tuning elements; one for tuning to the frequency of the wave desired and the other for control of the frequency of oscillation emitted from the local heterodyne.

The adjustment of these two controls to a point of resonance is very critical and the relative oscillatory motion produced by my improved control is particularly effective in finding the point of resonance, as will more fully appear hereinafter. Of course, it will be understood that this system of control can be applied to any radio circuits where several tuning elements have to be adjusted to reach points of resonance for varying wave lengths.

I have illustrated my invention in preferred form in the accompanying drawings, wherein:

Fig. 1 is a plan view of the general arrangement with some of the parts shown in elevation.

Fig. 2 is a front view of the supporting fork and associated parts.

Fig. 3 is a plan view of a modification of the central gearing arrangement with some parts shown in elevation.

Fig. 4 is a plan view of an alternative form of the invention.

Fig. 5 is a front view taken on line 5—5 of Fig. 4.

Fig. 6 is a modification of the gearing arrangement used in the alternative form of Fig. 4.

Referring now to the drawings:

In Fig. 1, two tuning elements, in this case variable condensers, are designated A and B; and C is the common controller member. This controller, or control knob, C, is secured to shaft 1 which extends through the panel 2 and the supporting fork 3; the supporting fork being secured to the panel 2 in some suitable manner as by bolts 4. The gear 5 which is secured to shaft 1 between the prongs of fork 3 is irregular in shape (see Fig. 2). Crown gears 6, which mesh with the gear 5, are mounted on shafts 7 which are supported by fork 3. Pinions 8, also mounted in shafts 7, in turn mesh with the crown gears 9. The crown gears 9 are secured to the rotor shafts 13 of the condensers A and B.

The springs 10 serve to keep the crown gears 6 constantly in mesh with the irregular gear 5, as it is turned; and the face of the pinions 8 is of such length that the pinions will not slip out of engagement with the crown gears 9 during the lateral movement of the shafts 7 incident to the turning of the irregular gear 5.

In order that the relation of the condensers A and B may be changed I provide the apparatus indicated by reference character D for disconnecting the train of gears from control knob C to one of the condensers A.

The bearing 11 for the left hand shaft 7 is mounted on a member 14 which is slidably keyed to the left hand prong 12 of the fork 3 (see Fig. 2). The position of member 14 and its bearing 11 is controlled by turning knob 15. This moves shoe 16 to a different position on the cam 17 and the spring 18, bearing on collar 19 which is secured to the shaft 20, moves the shaft 20 and the member 14, thereby moving pinion 8 away from crown gear 9. The shaft 20 is secured to member 14 by means of lug 21 and nuts 22. In order that shaft 20 may turn in the lug 21, these nuts 22 are not tightened against the lug 21 but merely serve to transmit the push and pull motion necessary to disengage and engage the gears 8 and 9.

The alternative gearing arrangement of Fig. 3 is designed so that the condensers A and B may be turned, from control knob C,

either with the relative oscillatory motion or in unison, at the will of the operator. This is accomplished by having a symmetrical gear 23 as well as the irregular gear 5 secured to shaft 1. The portion of shaft 1 extending through panel 2 and the base of the fork 3 is made long enough to permit movement of both the gears 5 and 23 into engagement with the crown gears 6. These crown gears 6 are separated sufficiently during shift from gear 5 to gear 23 by means of the cone 24 and the protuberances 25 which are secured to gears 6.

The operation of the apparatus is as follows:

The operator turns knob C which turns both the condensers A and B in the same direction until the desired point of resonance, of the circuits tuned by the condensers A and B, is reached; or if the desired point of resonance is not found, with a certain relative setting of the condensers, the operator turns knob D to disconnect the train of gears connecting knob C to condenser A and turns condenser A a little, then returns knob D to reconnect the train of gears, and the tuning operation from knob C is resumed. The ratio of gearing is such that approximately one relative oscillatory movement of condensers A and B will occur during their advance through 1 or 2 points on a standard 100 point condenser dial. That is: one revolution of the irregular gear 5, or the knob C, will move the condensers A and B, 1 or 2 points on their dials; and during this movement one cycle of the condensers' alternate lagging and leading, or relative oscillatory movement will occur.

The alternative arrangement shown in Figs. 4, 5 and 6 is designed to control a plurality of condensers A mounted on a common shaft E. In this arrangement, I have shown three condensers, each having a gear B secured thereto. The irregular gears D, meshing with gears B, are driven from the control knob C through a shaft which has universal joints at points F to allow for lateral motion incident to the turning of the irregular gears D. The springs S serve to hold the gears in mesh.

Fig. 6, a modification of this alternative arrangement, shows condenser A with its large gear B meshing with irregular gear D. In this case, however, there is another set of gears G and H interposed between the irregular gear D and the controller shaft, thereby eliminating the universal joints shown in Fig. 4.

I claim:

1. In apparatus of the character described, the combination of a pair of tuning elements including stators and rotors and control means for said rotors including a common control member, and means for driving said rotors from said member with an oscillating motion relative one to the other, together with means for disconnecting one of said

rotors from said control member to effect a change in the point at which the relative oscillating motion of one of said members begins.

2. In apparatus of the character described, the combination of a pair of variable tuning elements including stators and rotors, a common control member for said rotors, and a train of gears connecting said member with each of said rotors, the gears in said trains being configured and arranged to drive said rotors continuously in either direction but with alternate periodic increase and decrease of speed relative one to the other.

3. In apparatus of the character described, the combination of a pair of variable tuning elements including stators and rotors, a common control member for said rotors, and a train of gears connecting said member with each of said rotors, the gears in said trains being configured and arranged to drive said rotors continuously in either direction but with alternate periodic increase and decrease of speed relative one to the other, together with means for disconnecting one of said trains from its respective rotor.

4. In apparatus for tuning electrical circuits to resonance, the combination of a pair of tuning elements including stators and rotors, a common control member for said rotors, an irregularly shaped gear mounted on said member and a train of gears connecting each of said rotors with said irregularly shaped gear.

5. In apparatus of the character described, the combination of a pair of variable tuning elements including stators and rotors, a common control member for said rotors, and means for driving the rotors from said control member including trains of gears coupled with the rotors and the control member, said means being adapted to drive said rotors continuously in either direction but with alternate periodic increase and decrease of speed relative one to the other, together with means for altering the relative position of the points in the movement of said elements at which said periodic increase and decrease of speed occur including means for changing the position of the gears of one train with respect to those in the other.

In testimony whereof, I have hereunto signed my name.

FRANK L. MORSE.