

Sept. 5, 1944.

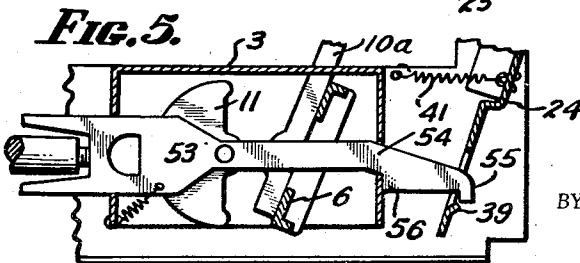
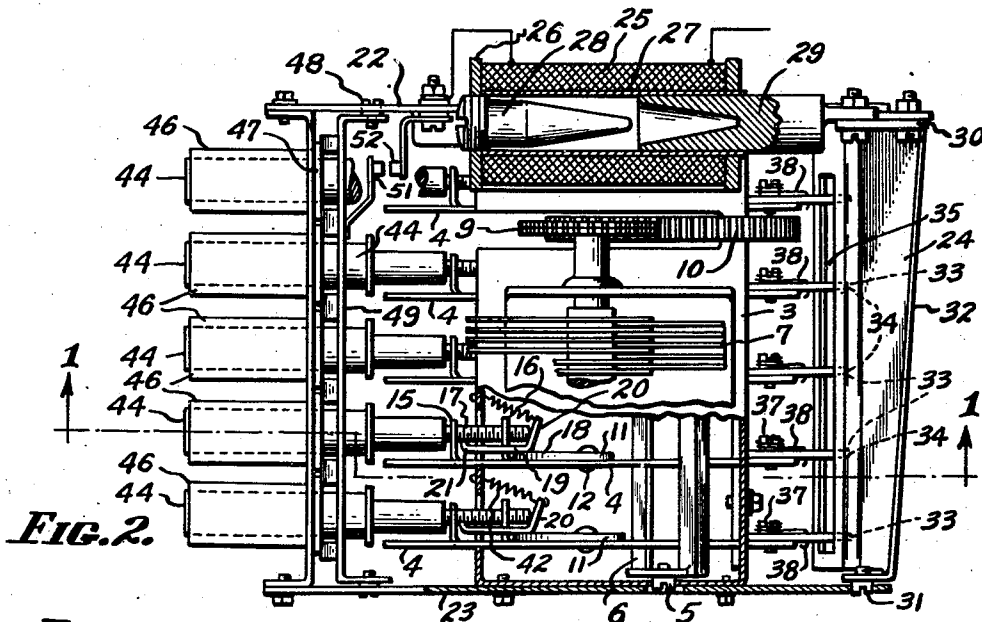
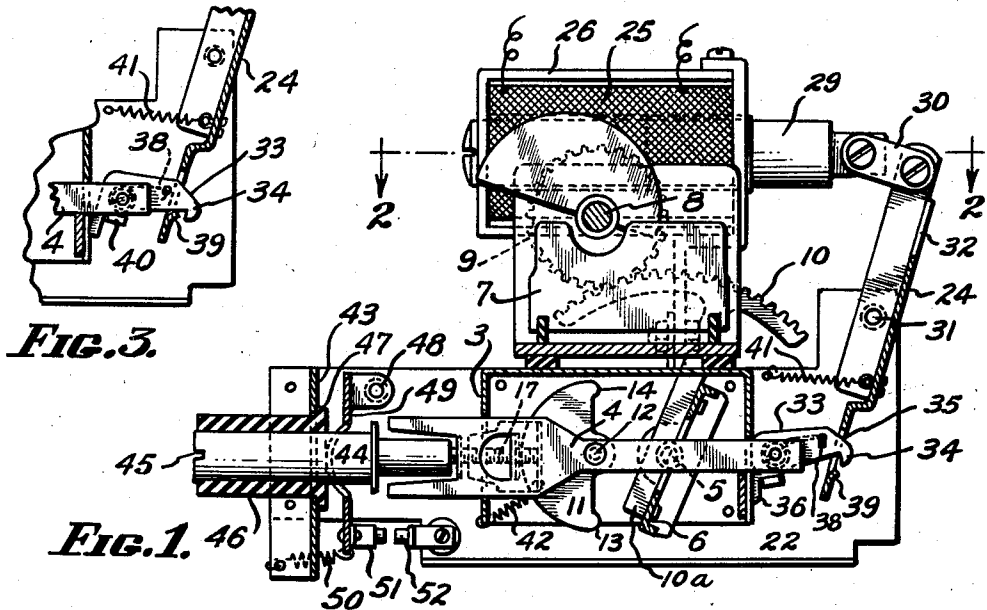
H. J. TYZZER

2,357,775

MECHANICAL MAGNETIC TUNING DEVICE

Filed March 4, 1939

2 Sheets-Sheet 1



INVENTOR.

HOWARD J. TYZZER.

BY

Allen & Allen
ATTORNEYS.

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H. J. TYZZER

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2 Sheets-Sheet 2

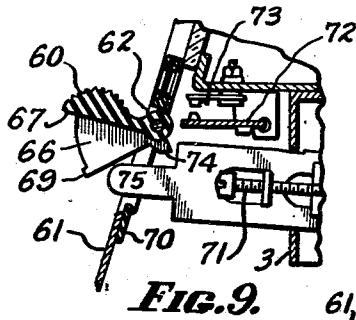


Fig. 9.

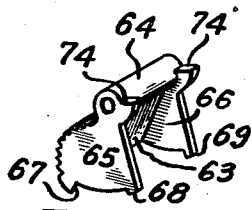


Fig. 10.

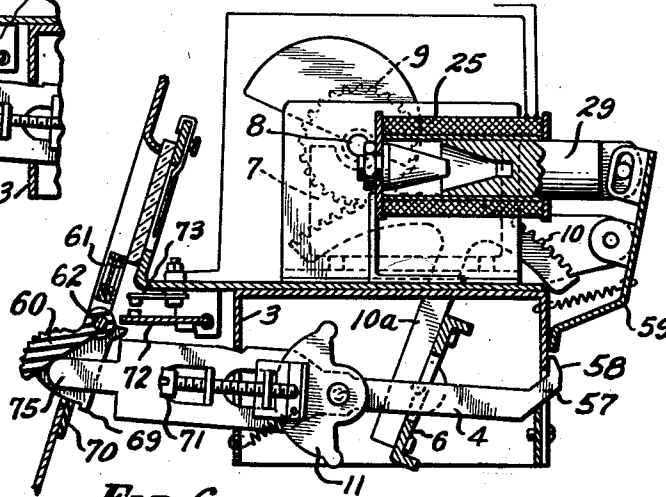


Fig. 6.

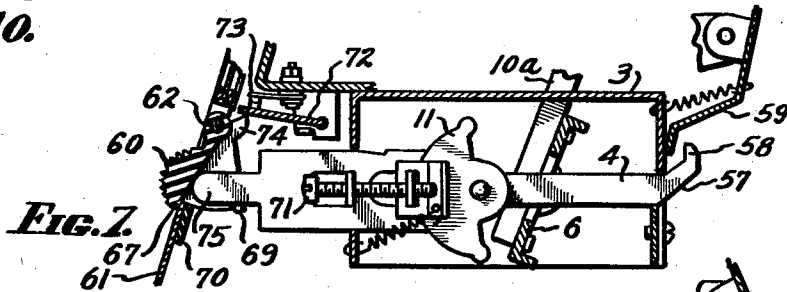


Fig. 7.

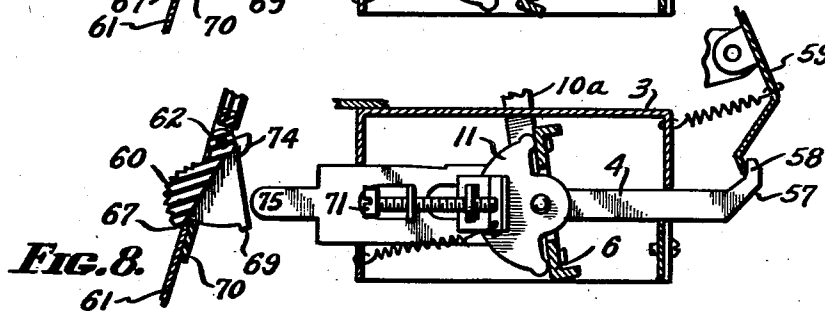


Fig. 8.

INVENTOR
HOWARD J. TYZZER
BY
Allen & Allen
ATTORNEYS.

UNITED STATES PATENT OFFICE

2,357,775

MECHANICAL MAGNETIC TUNING DEVICE

Howard J. Tyzzer, Cincinnati, Ohio, assignor to
The Crosley Corporation, Cincinnati, Ohio, a
corporation of Ohio

Application March 4, 1939, Serial No. 259,899

23 Claims. (Cl. 74—10)

My invention relates to a type of automatic tuning device employing plungers by means of which a movable member is caused to assume a number of preselected positions whereby to tune a radio set. The member so positioned may be connected through a suitable drive to the shaft of a condenser gang, it being desirable to do this in many instances because the angular range of positions of the positionable member will frequently be less than the angularity through which it is desired to turn the shaft of a condenser gang in tuning it to a plurality of stations over any particular range in a radio set. However, it is not without the spirit of my invention to couple the condenser directly to the positioned member, with appropriate re-design of the condenser for the purpose. It is characteristic of my present invention, however, that the main actuation of the several plungers, whereby they are driven home to position the positionable member, is accomplished under power. In a copending application entitled Station preselectors, in the names of Manning and Depweg, Serial No. 218,580, filed July 11, 1938, a structure has been disclosed involving a solenoid moving means for each plunger. My present invention renders this unnecessary, and herein I provide a single motive means with means whereby it may be selectively connected to the plunger, the actuation of which is desired, and means whereby it may be energized. My present construction therefore is an improvement in certain aspects over the application just referred to. In other aspects it brings in new functions, a more economical construction, greater compactness, a marked simplification of parts and a simple switch means as distinguished from a complicated one. In the structure of my present invention the actuation of the plungers is initiated by hand and is picked up and carried on by the motive means. This provides an improvement in operation as will hereinafter be apparent, and while it somewhat lacks the flexibility of the operation of the structure set forth in the application above (the actuation of that structure involving merely the actuation of switches, which of course could be located anywhere desired), yet it is not usually desired to operate a radio set from a remote point, and my present structure is to be preferred in most instances.

I employ in connection with my structure a number of the elements and arrangements set forth in my copending applications entitled a Push button tuning device, Ser. No. 226,520, filed Aug. 24, 1938, entitled a Push button tuning de-

vice, Ser. No. 192,258, filed Feb. 24, 1938, entitled Mechanical tuning device, Ser. No. 200,731, filed April 7, 1938, and entitled Automotive radio apparatus, Ser. No. 200,730, filed April 7, 1938.

The several objects of my invention other than those which have been indicated above, will be pointed out hereinafter or will be apparent to one skilled in the art upon reading this specification; and I accomplish these objects by that certain construction and arrangement of parts of which I shall now describe an exemplary embodiment and a modification. Reference is therefore made to the drawings wherein:

Figure 1 is a vertical sectional view through one form of my apparatus. This view is taken along the lines 1—1 of Fig. 2.

Fig. 2 is a plan view of the apparatus with parts broken away to show the construction of underlying parts and with parts also in section. The sectional representation is denoted by the lines 2—2 in Fig. 1.

Fig. 3 is a detailed view of the manner in which the engagement of the plungers with the driving member is established. It should be taken as alternative to the representation of corresponding parts in Fig. 1 where the condition is one of disengagement.

Fig. 4 is a perspective view of a type of engagement dog which I may employ.

Fig. 5 is a vertical sectional view of fragmentary character showing a simplified form of engagement means.

Fig. 6 is a vertical sectional view of another form of my apparatus showing the parts in the normal or at rest position.

Fig. 7 is a similar though fragmentary view showing the plunger actuated sufficiently to put the plunger into engagement position with respect to the operating motor mechanism.

Fig. 8 is a similar view showing the plunger drawn back by the operating mechanism.

Fig. 9 shows the devices in position for adjustment.

Fig. 10 shows a manual operating element in perspective.

The first form of my invention is shown in Figs. 1 to 4 inclusive, with a modification in Fig. 5.

In Fig. 1, I have shown a sub-frame member 3 in which certain plungers indicated generally at 4, may be journaled for longitudinal movement in side-by-side relationship. Also at the ends of this member I pivot, as at 5, a member 6 which is the member to be positioned by the plungers. This member is in the form of a rocking plate having reinforcing ribs where desired,

and perforated centrally at least at intervals for the passage of the tails on the plunger 4, as will be clear from the drawings. Considerable variation in the structure of this plate may be made without departing from the spirit of my invention.

In the particular form shown, I mount a condenser gang 7 on the sub-base 3. The shaft 8 of this condenser gang is connected by a gear 9 (which may be of the no lost motion variety as is known in this art and set forth in my copending applications referred to above). The gear 9 meshes with a gear segment 10 which is mounted by means of arm 11 on the plate 6. By this construction, as will be readily understood, the condenser gang is connected to the plate in such a way that positioning the plate will result in tuning the condenser. The condenser gang will also be provided with suitable manual tuning means and a dial. These have not been shown. They may be of any type conventional in the art. It will be understood that it is frequently necessary to tune the radio set by hand for various reasons connected with the operation of the set, and also for the purpose of making the settings for the automatic tuning means, as will be made clear hereinafter. In the particular embodiment shown, the several plungers 4 bear positioning means indicated at 11. In the form shown these are semi-circular members pivoted, as at 12, to the plungers 4 and bearing contacting ends 13 and 14 which come against oppositely directed portions of the plate 6 to position it. It will be noted that the movement of the plungers is not only transverse to the axis upon which the plate 6 is pivoted but also extend substantially through this axis. In Fig. 1 if the plunger 4 be moved to the right, the contacting means 13 will first come against the lower edge portion of the plate 6 and will move the plate in a counter-clockwise direction until the upper edge of it contacts with and is stopped by the contacting member 14. This gives a positive location to the plate in two directions.

Now the position which will be given to the plate 6 by the plungers respectively will be determined by the positions of the positioning members 11 on the plungers. This position is adjustable, and locking means are provided which will now be described. Reference is made to Fig. 2. In ears 15 and 16, which are preferably struck up out of the plunger, I provide a set screw 17. The semi-circular portion 18 of the member 11 lies against the plunger body on one side and on the other side is clamped by a member 19. This member is an angularly bent locking element slotted to go over the ear 16 and having the angularly bent end 20 against which the end of the set screw 17 bears. In the particular form shown, the locking member 19 also has an upwardly bent end 21 which engages the set screw. It will be apparent that the result of driving the set screw to the right in Fig. 2 will be to rock the plate 19 downwardly, causing its lower surface to bear against the upper surface of the portion 18 of the positioning member. The positioning member is thus clamped by the frictional engagement of two pairs of frictional surfaces. There is the engagement of a surface of the member 11 with a surface of the plunger, and there is the engagement of the other surface of the member 11 with the under-surface of the member 19. This gives a positive lock, not likely to become disengaged due to vibration and strain; and the construction also is such that the locking means does not tend to

"walk" during tightening so as to cause a shifting of the positioning member 11. It will now be apparent that if the positioning member 11 is fixed in an appropriate position on the plunger 4, the result of the actuation of that plunger will be to move the plate 6 and thereby the condenser 7 to a predetermined position appropriate to a station for which the mechanism has been set up. The number of plungers provided is not a limitation on my invention as will be clear. I have shown five, but more or less may be provided as desired. The manner in which the apparatus is set for the automatic tuning of preselected stations will be outlined hereinafter.

The sub-frame 3 is mounted on end frame members 22 and 23. These members have upwardly extending portions indicated at the right hand portion of Fig. 1; and to these portions I pivot a rocking plate 24 which is my power actuating member. A solenoid mechanism having a winding 25 and external core portions 26 is mounted also on an upwardly extending portion of the end frame member 22. The interior construction of this solenoid is shown in Fig. 2. The winding 25 is placed on a non-magnetic hollow sleeve 27. At one end, a tapered core member 28 is threaded into the external core 26 and extends inwardly of the sleeve 27. An armature 29 operates longitudinally of the sleeve 27. Its inner end has a conical depression corresponding to the conical end on the member 28. This construction not only increases the pull of the solenoid but also gives a controlled pull and a dash pot action so as to avoid shock. The armature 29 is connected to the upper end of the pivoted plate 24 at one side by a link 30. When the coil 25 is energized, the armature 29 will be drawn to the left in the figures, thus rocking the plate 24 in a counterclockwise direction about its pivot 31. Since the plate 24 has the armature connected to it at one end only, it may be tapered toward the other pivot as indicated at 32.

The purpose of the plate 24 is to drive the plungers 4 selectively when the plungers have been connected to it and when the coil 25 is energized. For selectively connecting the plungers to the driving member 24, I provide dogs 33 on the ends of the plungers beyond the right hand downwardly extending portion of the sub-frame 3. These dogs are illustrated in Fig. 4. Each comprises detent means 34 which extend through a slot 35 in the driving member 24 so as to clear this driving member when the detent means 34 is in upraised position as shown in Fig. 1. The dog is always in upraised position when the plungers 4 are furthest to the left, and this action arises through the contacting of an arm 36 on the dogs 33 with the sub-frame 3, as will be clear from Fig. 1. Each dog is held to its plunger by a suitable screw or stud 37 and each likewise has light spring means 38 tending to rotate the dog about its pivot so as to lower the detent means 34. Thus as illustrated in Fig. 3, as soon as a plunger 4 is driven slightly to the right, the spring 38 rocks the dog downwardly so that the detent means 34 can engage over an edge portion 39 of the driving member 24. This edge portion may be turned slightly outwardly, as indicated, to increase the effectiveness of the engagement of the detent means with the driving member. The downward swing of the dog is limited by abutment means 40 on the dog, which abutment means engage the end of the plunger.

When the coil 25 is not actuated, spring means 41 (Figs. 1, 3 and 5) return the driving member

24 to the position shown in the several figures. Also spring means 42 return the several plungers to their position furthest to the right as shown in the several figures, excepting when the plungers are manually actuated. The plungers when so returned have their dogs out of engagement with the driving member 24 as has already been explained. Thus no plunger is brought into connection with the driving member 24 until it is slightly driven to the right by hand. In this way the single motive means comprising the solenoid and the driving member 24 is enabled to act as a motor selectively for all of the several plungers.

With the exception of the differences which have already been noted, I may employ in my present construction the plungers of my copending applications set forth above, in which the ends of the plungers extend through openings in the front of the radio set and are provided with appropriate buttons. When these buttons are removed, the head of the set screw which actuates the locking means as hereinabove described, becomes accessible to the operator. In the drawings of this case, however, I have disclosed a variant of this construction in which instead of extending the bodies of the plungers through a front frame member 43 which is fastened between the members 22 and 23, I terminate the plunger bodies short of this cross member and extend through it enlarged heads 44 on the set screws 17. These enlarged heads may be provided with slots 45 for engagement with a screw driver or may be otherwise fitted for adjustment. The heads of the set screws therefore act as manually operable means for the plungers and when these heads are contacted with the finger and are slightly depressed, a plunger will be driven to the right in the several figures and its dog caused to engage with the driving member 24. Surrounding the enlarged heads 44 of the set screws, I provide perforated push button means 46 which likewise pass through perforations in the cross frame member 43. These push buttons are preferably made of insulative substance and are provided with heads 47 limiting their movement to the left. The members 46 not only provide a decorative finish to the radio set, but also in this embodiment constitute the means for the actuation of a switch whereby the winding 25 is energized. To this end I pivot to the frame members 22 and 23, as at 48, a plate 49 centrally perforated at intervals for the passage of the enlarged heads 44 of the set screws 17. The plate 49 is urged clockwise about its pivot by means of a spring 50. The plate bears contact means 51 cooperating with contact means 52 fastened to and insulated from the frame member 22. The contact means 51 and 52 are located in a circuit including a source of power and the winding 25. Since I provide but one motive means common to the several plungers, I have thus provided but one switch common to the several plungers. The switch mechanism is actuated by the members 46.

In operation when automatic tuning is desired the operator contacts the ends of the members 44 and 46 with his finger, pushing to the right in the several figures. This results first in a movement of the plunger 4 to the right sufficient to cause the detent means 34 on the dog 33 on its end to come into engagement with the driving member 24. The necessary motion is transmitted to the plunger 4 through the enlarged head 44 of the set screw thereon. Concurrently, however, the depression of the member 46 has rocked the

switch plate 49 counterclockwise in the drawing, so as to close the contact arrangement 51, 52. When this happens, the winding 25 is energized, the armature 29 drawn inwardly, and the driving means 24 rocked counterclockwise. This results, as will readily be understood, in driving the plunger 4 toward the right as far as it will go, thereby positioning the plate 6 and tuning the condenser 7. The member 46 does not follow this movement, the enlarged head of the set screw merely sliding with the member 46. As soon as the pressure of the finger of the operator is released, the spring 50 returns the switch plate 49 and opens the circuit. The driving member 24 rocks in a clockwise direction through the action of its spring 41 and the plunger 4 is drawn to the left through the action of its spring 42. As soon as it reaches its position furthest to the left the dog 33 rocks upwardly, as has been explained, and disengages the plunger from the driving means. In moving to the left the plunger assembly comes away from the plate 6, but the condenser having been tuned remains in tuned condition, as will be understood.

When it is desired to effect an initial setting or to change settings on the apparatus, the means 44 and 46 are depressed as usual; but the means 46 is held inwardly by the fingers so as to maintain the solenoid in energized condition and so as to maintain the plunger 4 in its position furthest to the right. Then by means of a screw driver or other suitable implement, the set screw is loosened, thereby rendering the positioning element 11 free to move about its pivot 12. The radio set is then tuned by hand to the station for which a setting is desired, and it will be evident that the tuning of the condenser results in a repositioning of the member 11 on the plunger 4. When the new position, appropriate to the selected station, has been attained the set screw 17 is tightened again, thereby fixing the member 11 on the plunger in the new adjusted position. Thereafter the member 46 is released and the plunger and driving means returned to their starting positions.

In Fig. 5 I have shown a somewhat simplified means whereby the plunger may be engaged with the driving means 24. The plunger 53 is in this instance journaled as before in the frame 3, but the right hand end of the plunger is formed so as to have a downward slope as illustrated at 54. Detent means 55 are provided at the end of the plunger. Moving the plunger to the right in Fig. 5 will result in the end portion of the plunger riding downwardly on the sloped portion 54 in its bearing in the frame or base 3. This downward motion is sufficient to cause the detent 55 to engage the portion 39 of the driving means 24, as will be clear. The sloped portion 54 need not be greater in length, however, than to accomplish this function, so that thereafter the plunger 53 moves to the right axially. In order to limit the motion of the plunger 53 to the left I may provide the end of it with a shoulder 56 as shown.

In Figs. 6 to 10 inclusive, I have shown an improved and simplified type of apparatus now being employed by me on automobile radio sets. Much of the mechanism is the same, and has therefore been given the same index numerals. The general arrangement of the condenser and the automatic tuning means is the same. The right hand end of the plunger bodies 4 has been given an upward slant as at 57 and provided with a detent 58. A shorter operating plate 59

is employed and the configuration of the plunger, as just described, is such as to make the right hands thereof, as shown in the drawings, rise slightly when the plungers are depressed, so as to bring the detent portion 58 into engagement with the operating plate.

In this embodiment, manual operating means are not connected directly to the plungers. On the contrary, I pivot members 60 in apertures of the front panel 61 of the radio set at 62. The form of these members is clearly shown in Fig. 10. Each consists of a body portion 63 having a barrel shaped portion 64, through which a pivoting rod or the like is passed. It will be understood that this pivoting rod passes through perforations in suitable supporting ears or the like on the panel 61. At each end of the body 63, there are sector shaped portions 65 and 66. These are shorter than the body 63 so as to leave a projecting portion 67. This abutting the edge of the cut out portion of the panel in which the body moves, limits the counter-clockwise movement of the members 60 as clearly shown in Figs. 7 and 8. At the rear corners of the sector shaped portions 65, 66, I provide shorter ears 68 and 69. These, abutting a resilient strip of material, such as a strip of rubber 70 affixed to the panel 61, limit accidental movement of the members 60 in a clockwise direction. Nevertheless, the members 60 can be deliberately raised as in Fig. 9 by pulling upwardly with sufficient force to cause the ears 68 and 69 to pass the rubber strip 70. When this is done, it will be evident that a screw driver can be passed through the opening in the front panel in which the member 60 operates, so as to be engaged with the head of the screw 71, both for turning this screw and for depressing the plunger when effecting a setting of the automatic tuning apparatus.

A switch plate 72 is pivoted on a frame member, as shown, and bears a contact. A cooperating contact member is shown at 73. These contact members constitute part of a circuit in which is located the solenoid winding 25. The arrangement is such, that when the switch plate 72 is rotated on its pivot in a clockwise direction, the circuit will be closed.

To operate the switch plate 72, I provide the operating member 60 with one or more ears 74 which, swinging with the member about its pivot, contact and raise the left hand end of the plate 72 when the operating member 60 is in the position shown in Figs. 7 and 8.

A projecting end 75 on the plunger 4 comes against the body 63 of the operating member 60, maintaining it normally in the position shown in Fig. 6. Pressure of the finger against the operating member, so as to swing it to the position shown in Fig. 7, first moves the plunger to the right sufficiently to cause the detent 58 on the end of the plunger to come into a position for engagement with the driving plate 59, and second closes the circuit to the solenoid winding 25 by moving the switch plate 72. The energization of the solenoid draws the armature 29 to the left, swinging the plate 59, and drawing the plunger 4 to the right until the positioning means thereon tunes the condenser in the manner fully described above.

Modifications may be made in my invention without departing from the spirit of it.

Having thus described my invention, what I

claim as new and desire to secure by Letters Patent, is:

1. In automatic means a condenser having a positionable member, a casing, a body movable in said casing to position said member in tuning said condenser, a front panel and a composite manually actuatable means extending through said front panel, said means comprising a pair of elements simultaneously actuatable, one of said elements being connected to said body for manual actuation of it, and the other of said elements having an operating connection with a switch.

2. In automatic tuning means, a casing, a condenser having a positionable member, a body movable in said casing to position said member in tuning said condenser, a front panel and a composite manually actuatable means extending through said front panel, said means comprising a pair of elements simultaneously actuatable, one of said elements being connected to said body for manual actuation of it, and the other of said elements having an operating connection with a switch, a switch, an electromotive means for said body, and a connection between said switch and said electromotive means.

3. In automatic tuning means, a casing, a plunger mounted for longitudinal movement in said casing, a condenser, positionable means connected to said condenser and adapted to be positioned by said plunger, electromotive means for said plunger, a front panel, a manually operable means for said plunger adjacent said panel, a second manually operable means in close proximity to the first mentioned manually operable means and simultaneously actuatable therewith, a switch, a connection between said switch and said second manually operable means, and a connection between said switch and said electromotive means.

4. In an automatic tuning device, a casing, a plunger bearing positioning means longitudinally slidable in said casing, a condenser, positionable means connected to said condenser, said positioning means being adjustable and provided with adjustment means comprising a screw, a front panel, a head on said screw projecting through said front panel, relatively slidable push button means surrounding said head and forming therewith a composite manually actuatable means, an electromotive drive for said plunger, switch means disposed in the path of said slidable push button means so as to be operated thereby and a connection between said switch means and said electromotive means.

5. In an automatic tuning device, a casing, a condenser, positionable means in connection with said condenser, a series of bodies movable in said casing to position said positionable member, a common electromotive drive for all of said bodies, means on each of said bodies whereby upon manual actuation of a selected body said body may be brought into driving connection with said electromotive drive, means for actuating said bodies for said purpose and switch means effective upon actuation of said bodies to energize said electromotive driving means.

6. In an automatic tuning device, a casing, a condenser, positionable means in connection with said condenser, a series of bodies movable in said casing to position said positionable member, a common electromotive drive for all of said bodies, means on each of said bodies whereby upon manual actuation of a selected body said body may be brought into driving connection with

said electromotive drive, means for actuating said bodies for said purpose and switch means effective upon actuation of said bodies to energize said electromotive driving means, said means for actuating said bodies comprising a depressible member pivoted in front of each body, said depressible members having means for actuating said switch means.

7. In an automatic tuning means, a casing, a plunger slidable in said casing and bearing positioning means, a positionable member in said casing, a condenser, a connection between said positionable member and said condenser, an electromotive driving means, means for manually actuating said plunger, means effective upon the manual actuation thereof to connect said plunger with said driving means, and means also effective upon the actuation thereof to energize said driving means.

8. In an automatic tuning device, a plunger, manually actuatable means for said plunger, an electromotive drive having a moving part with a detent portion, a dog on said plunger having a cooperating detent portion, means on said casing for moving said dog to one position, resilient means for urging the plunger to inactive position whereby said dog is so moved, and means for moving said dog into a position where said detent means interengage when said plunger is manually actuated.

9. In an automatic tuning device, a plunger, manually actuatable means for said plunger, an electromotive drive having a moving part with a detent portion, a dog on said plunger having a cooperating detent portion, means on said casing for moving said dog to one position, resilient means for urging the plunger to inactive position whereby said dog is so moved, and means for moving said dog into a position where said detent means interengage when said plunger is manually actuated, said plunger bearing adjustable positioning means, and means for the adjustment thereof comprising a screw, a front panel, a head on said screw extending through said front panel, push button means slidably surrounding said head and extending through said front panel, switch means in operative relationship to said last mentioned means, and a connection between said switch means and said electromotive means.

10. In automatic tuning means, a casing having interspaced walls, a plunger mounted for sliding movement in said interspaced walls and having a head portion projecting through the front wall, and a tail portion projecting through the rear wall, a dog pivoted to said tail portion, said dog having detent means, and means for contacting said rear wall whereby said dog is moved to one position, resilient means urging said plunger in a direction toward said front wall, electromotive driving means having a moving member positioned so as to be engaged by said dog when said dog is in a second position, and means for moving said dog to said second position to effect said engagement when said plunger is moved toward said rear wall.

11. In automatic tuning means a casing having front and rear walls, a plunger journaled in said walls for sliding movement, electromotive means for said plunger having a detent, said plunger having a portion extending through said rear wall and bearing a cooperating detent, resilient means urging said plunger toward said front wall, the portion of said plunger extending through said rear wall having a shape such that when

the plunger is moved toward said rear wall the end thereof will have a component of motion in a non-axial direction whereby to engage said detent means.

12. In automatic tuning apparatus a condenser, positionable means connected to said condenser whereby it may be tuned, a series of bodies movable with respect to said positionable member to position it selectively, a common electromotive drive for said bodies, and concurrently acting means mechanically connected to each of said bodies for selectively effecting connection of said bodies to said drive and for actuating energizing means for said electromotive means.

13. In automatic tuning apparatus a condenser, positionable means connected to said condenser whereby it may be tuned, a series of bodies movable with respect to said positionable member to position it selectively, a common electromotive drive for said bodies, and concurrently acting means for selectively effecting connection of said bodies to said drive and for actuating energizing means for said electromotive means, said concurrently acting means comprising a pivoted member adjacent each body, and having a portion for contacting and moving said body, and a portion for actuating said energizing means.

14. In automatic tuning apparatus, a casing, plungers slidably mounted in said casing, a solenoid supported by said casing and connected to a pivoted driving member having a portion adjacent the ends of said plungers, cooperating detent means on said plungers and on said member, means effective upon actuation of said plungers to interengage said detent means, a front panel, a portion of said plungers extending through said front panel for manual actuation, manually actuatable means adjacent each of said last mentioned portions for operating a switch, a switch plate common to said last mentioned members, cooperating contact means in connection with said switch plate and forming a switch, and a connection between said switch and said solenoid.

15. Apparatus as claimed in claim 14 in which the plungers have adjustable positioning means comprising screws, said screws having cylindrical heads extending through said panel and said second mentioned manually operable means comprising push button means of perforated character surrounding the heads of said screws.

16. In a radio set, a front panel having an aperture, an operating member moving in said aperture and pivoted to said panel, a condenser, means movable to tune said condenser, driving means for said movable means, a portion of said movable means being located in a position to be contacted by said operating member, and means in connection with said operating member for energizing said driving means.

17. Apparatus as claimed in claim 16 in which said operating member may be moved to a position to give access to said movable means.

18. In a radio set, a front panel having an aperture, a member pivoted to swing in said aperture, said member having a body portion and side flanges, with ears thereon, resilient means attached to said panel for engaging said ears to prevent accidental movement of said member beyond a given range while permitting forcible movement thereof beyond said range, a condenser, a plunger movable to tune said condenser, a portion of said plunger being located in a position to be contacted by said member.

19. In a radio set, a front panel having an

aperture, a member pivoted to swing in said aperture, said member having a body portion and side flanges, with ears thereon, resilient means attached to said panel for engaging said ears to prevent accidental movement of said member beyond a given range while permitting forcible movement thereof beyond said range, a condenser, a plunger movable to tune said condenser, a portion of said plunger being located in a position to be contacted by said member, a switch plate, and means on said member for moving said switch plate.

20. In a radio set, a front panel having an aperture, a member pivoted to swing in said aperture, said member having a body portion and side flanges, with ears thereon, resilient means attached to said panel for engaging said ears to prevent accidental movement of said member beyond said range, a condenser, a plunger movable to tune said condenser, a portion of said plunger being located in a position to be contacted by said member, a switch plate, means on said member for moving said switch plate, a driving means for said plunger, and means to bring said plunger into engagement with said driving means when said plunger is moved, whereby actuation of said first member serves both to bring said plunger into engagement with said driving means and to energize said driving means to move said plunger further.

21. In a radio control device, a control drive

member, a slide having means adapted to engage the control drive member to move it to a predetermined position, a manually movable member associated with the slide, power drive means comprising a power device and a power drive member associated with the slide, and means whereby manual movement of the member causes operative connection between the slide and power drive member and places the power drive in operation.

22. In an automatic tuning means, a condenser having a positionable member, a casing, a body movable in said casing to position said member in tuning said condenser, a switch, a composite manually actuable means, said means comprising a pair of elements simultaneously actuable, one of said elements being connected to said body for manual actuation of it, and the other of said elements having an operating connection with the switch, and electromotive means for said body controlled by said switch.

23. In automatic tuning apparatus a condenser, a positionable member connected to said condenser whereby it may be tuned, a series of bodies movable with respect to said positionable member to position it selectively, a common electromotive drive for said bodies, and concurrently acting means mechanically connected to each of said bodies for selectively effecting connection of said bodies to said drive and for actuating energizing means for said electromotive means.

HOWARD J. TYZZER.