Jan. 23, 1945. A. E. GERSCH 2,367,860

RADIO CONTROL DEVICE

Filed April 1, 1939 3 Sheets-Sheet 1

Fig. 1.

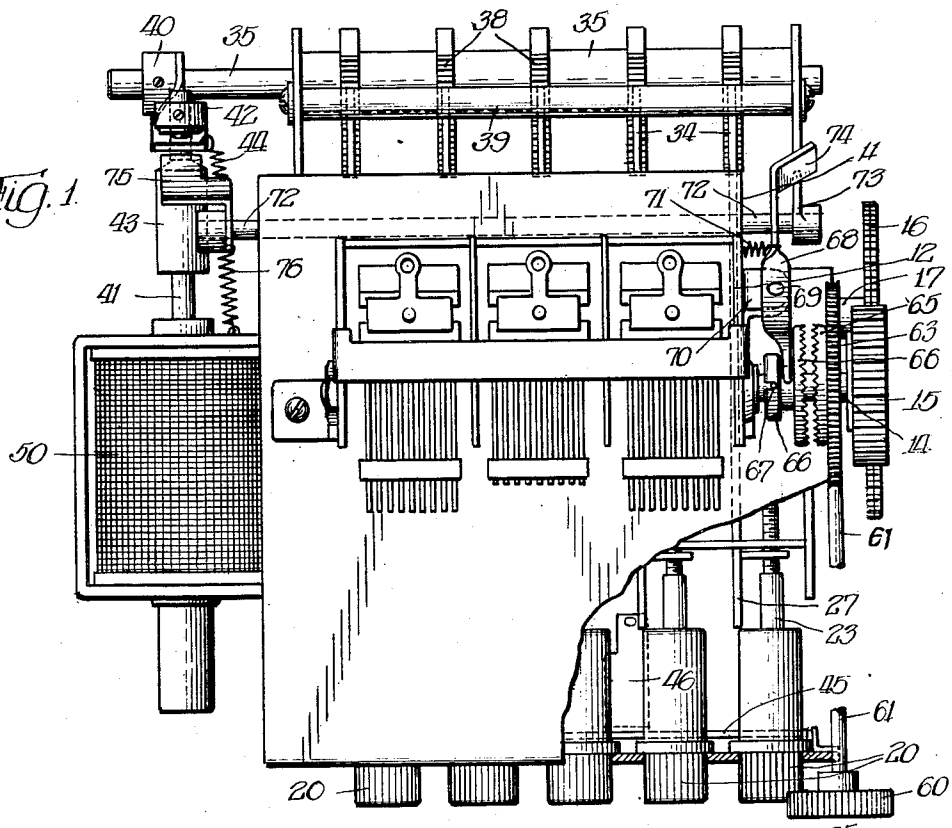
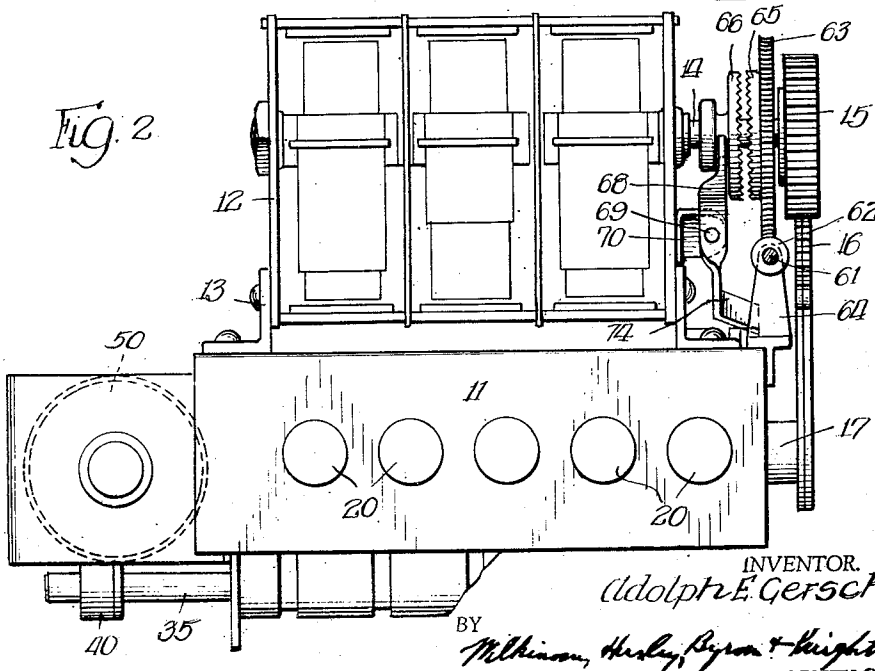


Fig. 2.



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Fig. 3.

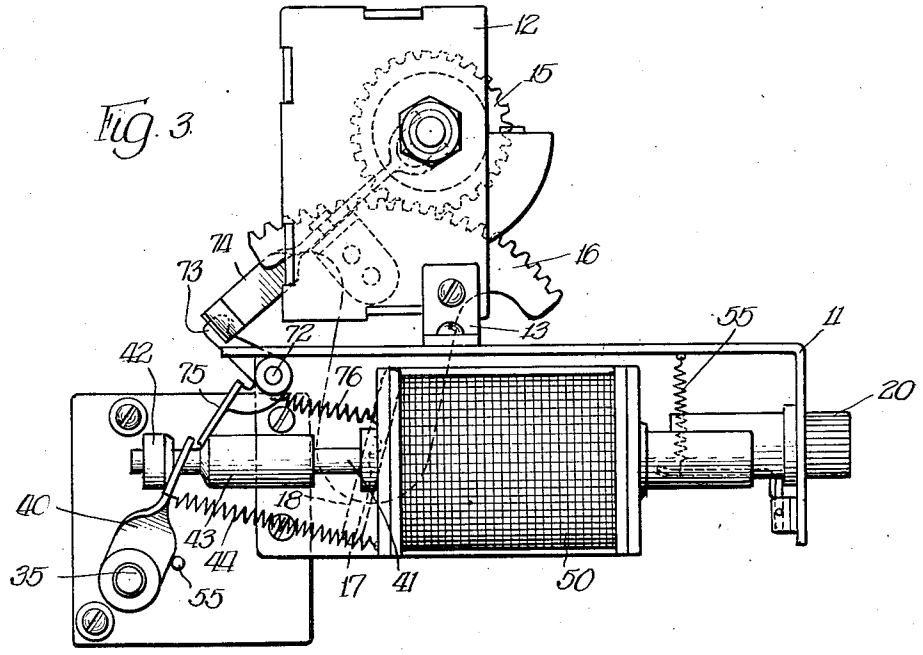


Fig. 4.

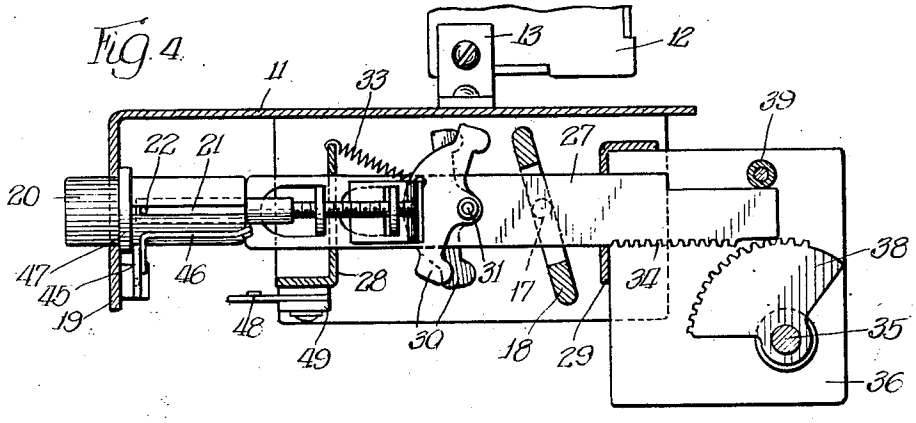
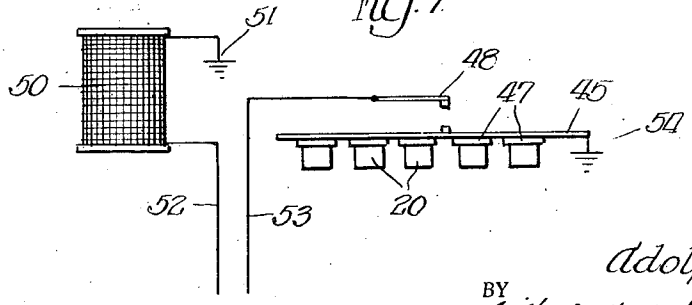


Fig. 7.



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Fig. 5

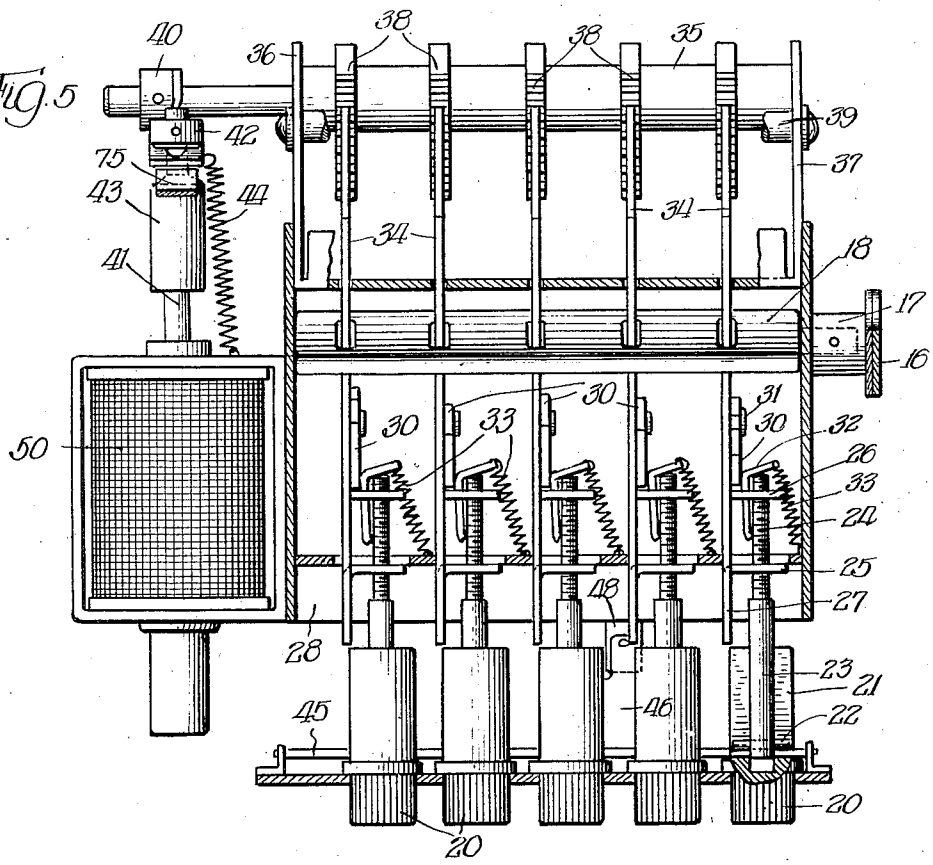
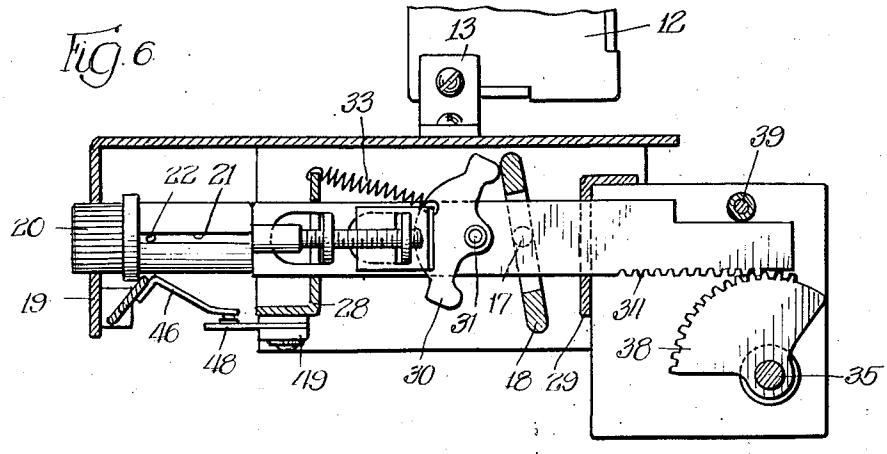


Fig. 6



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UNITED STATES PATENT OFFICE

2,367,860

RADIO CONTROL DEVICE

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Application April 1, 1939, Serial No. 265,400

2 Claims. (Cl. 74—10)

This invention relates to a new and improved radio control device and more particularly to a tuning control of the type employing manually operable buttons for tuning a radio receiver to predetermined stations.

Different types of such push button controls have been developed and many of them require considerable manual pressure in order to move the control buttons through the distance necessary to accomplish the complete actuation of the tuning device. This heavy manual pressure and relatively long travel of the push button is not only undesirable in itself, but also has undesirable effects. With light console cabinets and especially with the smaller table models, the pressure upon the button required for tuning the set may tilt or push the entire set so that it is necessary for the user to hold down the set while operating the push button. A further effect is that there may be a tendency for the user to fail to apply adequate pressure or to cause the full travel of the button and consequently there will result a failure to tune in the desired station correctly.

A further difficulty is present in some types of construction in which the push buttons serve to move the main tuning condenser. Where a gear reduction or worm gear is present between the hand tuning drive and the main tuning condenser, this drive must be reversible if the push buttons are to operate the condenser. When such drives are reversible they impose a considerable additional load upon push button operation.

It is an object of the present invention to provide a new and improved control device for tuning radio receivers or the like.

It is a further object to provide a construction in which stations are fully and accurately tuned by light pressure upon the button and by short manually caused travel of the button.

It is an additional object to provide a device of this character in which the tuning is initiated manually and completed by electric power.

It is also an object to provide a control in which the station selecting devices are normally disconnected from the power driving mechanism.

It is a further object to provide a power drive construction adapted for use in connection with different types of push button control devices.

It is another object to provide in connection with such a construction, means whereby the usual hand drive may be disconnected from the tuning mechanism automatically upon push button operation.

It is an additional object to provide apparatus which is simple in design and construction and adapted for commercial production and use.

Other and further objects will appear as the description proceeds.

I have shown a preferred embodiment of my invention in the accompanying drawings, in which—

Figure 1 is a plan view of the tuning and control assembly, partly broken away to show the construction;

Figure 2 is a face view of the apparatus of Figure 1;

Figure 3 is a side elevation of the construction of Figure 1 as seen from the left;

Figure 4 is a vertical section showing a push button in the out or inoperative position;

Figure 5 is a horizontal section taken on line 5—5 of Figure 4;

Figure 6 is a view similar to Figure 4 but showing the push button in an intermediate operating position; and

Figure 7 is a diagrammatic showing of the solenoid circuit.

In the drawings the base 11 carries the tuning condenser 12 which is supported from the base by the brackets 13. This condenser 12 is shown as having three sections for tuning various circuits in a radio receiver. The construction of the condenser may be of any usual type and such construction has no bearing on the present invention.

The condenser is provided with a shaft 14 carrying the gear 15 which meshes with the gear sector 16 secured to shaft 17. This shaft 17 is secured to the yoke 18, which is journaled in the downturned ends of the base 11. This yoke 18 serves to turn shaft 17 and, by means of gear sector 16 and gear 15, to tune the condenser 12. The base 11 has a down-turned front portion 19 provided with a plurality of aligned holes to receive the push buttons 20. These push buttons 20 have slots 21 formed therein to receive the pins 22 carried by the push rods 23, as best shown in Figures 4 and 5. The push rods 23 have reduced threaded portions 24 which are screwed into the outturned lugs 25 and 26 formed on the slide members 27.

These slide members 27 extend through the yoke 18 and slide in the slots formed in the intermediate frame members 28 and 29. Each slide is provided with an adjustable tuner actuating member 30 which is pivoted to the slide at 31. This adjustable member 30 is clamped in adjusted position by means of the sliding clamp member 32. The clamping action is caused by the thrust of the end of the threaded portion 24 of the push

rod 23. The clamping member 32 is connected to the cross member 28 by the return spring 33. This return spring serves to maintain the slides normally at their outer limit of movement with the push buttons extending through the downturned portion 19 of the frame 11. The spring 33 also serves to pull the clamp member 32 away from the member 30 when the parts are loosened for adjustment.

The inner lower edge of the slide 27 is provided with a rack 34. The power drive shaft 35 is carried in the supporting brackets 36 and 37. This shaft carries a plurality of gear sectors 38, one of which is aligned with the rack 34 of the slide 27. It will be noted that with the slide in the retracted position, as shown in Figure 4, the rack 34 is out of mesh with the gear sector. The elongated guide roller 39 is located above the slides and serves to hold them down in engagement with the racks.

The power drive shaft 35 is provided with the crank arm 40, the upper end of the arm being twisted at right angles to the body of the rod and having an opening therein to receive the solenoid pull rod 41 as shown in Figure 3. The collars 42 and 43 are secured to the pull rod to act as thrust collars so that the movement of the pull rod 41 actuates the arm 40. It will be apparent that when the parts are in normal position, the pull rod is in the extreme right-hand position with the arm 40 against the stop 55 as shown in Figure 3, or looking at it in the opposite direction as shown in Figure 4 the gears 38 are at their counterclockwise limit of movement. The spring 44 is secured to the arm 40 and maintains the parts normally in this position.

Referring now to Figures 4 and 7, the movable contact supporting member 45 is pivotally supported in the ears 46 extending from the front 19 of the base 11. This member 45 carries the movable contact 46. The upper edge of the member 45 is opposite the shoulder 47 on the push button 20. The fixed contact 48 is supported by insulating means 49 from the cross frame member 28. The solenoid circuit is indicated diagrammatically in Figure 7. The solenoid 50 has one end of its coil grounded to the frame, as indicated at 51, and the other end connected through line 52 to any source of power. The opposite side 53 of the power source is connected to the insulated fixed contact 48. The movable contact carrying member 45 is grounded to the frame as indicated at 54 in Figure 7.

The tuner is provided with means for manual tuning of the condenser 12. This means comprises a tuning knob 60 operating a shaft 61 which is provided with a worm 62 meshing with the worm gear 63. The shaft 61 is supported by the bracket 64 from the base 11. The worm gear 63 is loosely mounted on the condenser shaft 14 and has secured thereto a clutch member 65. The complementary clutch member 66 is slidably fitted on the shaft 14 facing the clutch member 65. As shown in Figure 1 the clutch member 66 has a slotted connection with a pin 67, which pin passes into the shaft 14 so that this member is caused to rotate with the shaft 14.

The clutch operating yoke 68 is pivoted at 69 to a bracket 70 secured to the base 11. The spring 71 connects the clutch operating yoke and the chassis to normally maintain the clutch in closed position. The clutch actuating shaft 72 is carried by the base 11 and at the right end, as seen in Figure 1, has a lever 73 secured thereto. This lever 73 is adapted to engage the outturned end 74 of the clutch lever 68 to release the clutch when the shaft 72 is locked in the clockwise direction as seen in Figure 3. The opposite end of the shaft 72 is provided with a lever 75 adapted to engage the collar 43 on the solenoid pull rod 41. The pull back spring 76 normally maintains the lever 75 against the collar 43 on the pull rod.

The method of setting up the apparatus so that each slide tunes the condenser 12 to a predetermined frequency or setting, in itself forms no part of the present invention and need only be very briefly described. By turning the push button 20 associated with the particular slide under adjustment, the threaded portion 24 is retracted to release the engagement of the clamp 32 with the member 30. The push button then is forced in to cause the member 30 to engage with the actuating yoke 18, which yoke is turned to such a position as to tune in the desired station. This may be accomplished either by directly moving the yoke or by moving the condenser itself, which is directly connected to the yoke by means of gear 15 and quadrant 16. With the member 30 held firmly against the yoke 18, the push button is then turned to move the threaded portion 24 inwardly to positively clamp the member 30 by means of the clamp member 32. Thereafter, at any time when the slide is moved inwardly, the member 30 will engage the yoke 18 to swing the yoke shaft 17 and consequently the quadrant 16 so as to rotate the condenser by means of gear 15 to the same position at which the slide was set. This method of adjustment and the construction involved are independent of the power drive, although the power drive will normally function to retain the member 30 against the yoke 18 during the adjustment.

In operation of the apparatus to tune the set automatically, it will be apparent that a slight inward movement of a button 20 to the position shown in Figure 6 will cause the movable contact 46 to engage the fixed contact 48, thus energizing the solenoid and moving the solenoid plunger outwardly or to the left as shown in Figure 3. This movement of the plunger moves the gears 38 in the clockwise direction as seen in Figures 4 and 6. While the rack 34 is normally out of engagement with the associated gear 38, the initial slight movement of the button 20 to the position shown in Figure 6 serves to bring the end of the gear 38 in mesh with rack 34 before the solenoid is energized. Consequently, as soon as the solenoid is energized the shaft 35 is rotated in a clockwise direction as seen in Figures 4 and 6, the gears 38 move in the same direction and the gear associated with the slide pushed in draws that slide to the right until the member 30 is stopped by both its upper and lower portions engaging the yoke 18. At this position there can be no further inward movement of the slide.

It is to be understood that Figure 6 shows an intermediate position with the rack in mesh, but with the member 30 just making engagement with the yoke 18. Due to the slotted connection between the push button 20 and the push rod 23, the push rod is free to move to the right, carrying with it pin 22 without any additional movement of the push button itself.

When the push button is released, the movable contact 46 moves away from the fixed contact 48, being pulled in this direction by the spring 55 shown in Figure 3, this spring also serving by means of member 45 to push the button 20 out to its normal position. As the solenoid circuit is broken, the spring 44 moves shaft 35 in counter-

clockwise direction and the gear 38 moves the slide 27 to the left as seen in Figures 4 and 6. The associated return spring 33 connected to the slide returns the slide further so that rack 34 is disengaged from the gear 38. It will be apparent that tuning is in no way dependent upon the exact meshing of the rack 34 with any specific point in the gear 38. The gear 38 simply serves to pull the slide and the motion of the slide is stopped by engagement of member 30 with the yoke 18.

The automatic declutching mechanism functions to disconnect the worm drive from the condenser shaft whenever push button tuning is used. The parts are normally in position with the clutch members 65 and 66 in engagement so that operation of the knob 60 turns the shaft 14 of the tuning condenser 12. When any push button is pressed in to put the solenoid in operation, during the initial movement of the solenoid pull rod 41 to the left as seen in Figure 3, the collar 43 engages lever 75 to rotate shaft 72 in the clockwise direction. This causes the lever 73 to push against the upturned end 74 of the clutch control lever 68, which swings the yoked end of that lever to the left, as seen in Figures 1 and 2, separating the clutch members and declutching the worm drive from the shaft. All of this takes place before the collar 43 engages the upper portion of lever 40 to operate shaft 35, and consequently effect the tuning of the condenser. Whenever the solenoid is released so that the pull rod 41 returns to its normal position as shown in Figure 3, the pull back springs 76 and 71 serve to restore the parts to normal position with the clutch discs 65 and 66 in engagement.

While my construction has been shown in connection with one specific form of push button tuning mechanism having one form of means for locking and adjusting the action of the slide, it will be apparent that it may be adapted for use with any push button operated slide regardless of the tuning or adjusting mechanism serving to connect the slide to the tuning element of the radio receiver or the like.

I have shown one preferred embodiment of my invention but this is to be understood as illustrative only, as it is capable of modification and change to meet varying conditions and requirements, and I contemplate such variations as come within the spirit and scope of the appended claims.

I claim:

1. In a radio control device, a control drive member, a manually movable slide having means adapted to engage the control drive member to move it to a predetermined position, a rack formed on said slide, a gear adapted to coact with the rack to move the slide, electrical drive means for the gear, and means whereby an initial manual movement of the slide places the electrical means in operation.

2. In a radio control device, a control drive member, a manually movable slide having means adapted to engage the control drive member to move it to a predetermined position, a rack formed on said slide, a gear adapted to coact with the rack to move the slide, said rack being normally out of engagement with the gear, electrical drive means for the gear, and means whereby an initial manual movement of the slide meshes the rack with the gear and places the electrical means in operation.

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