

Aug. 19, 1941.

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2,253,433

RAPID SELECTOR MEANS FOR RADIO SETS AND THE LIKE

Filed Nov. 10, 1937

2 Sheets-Sheet 1

FIG. 1.

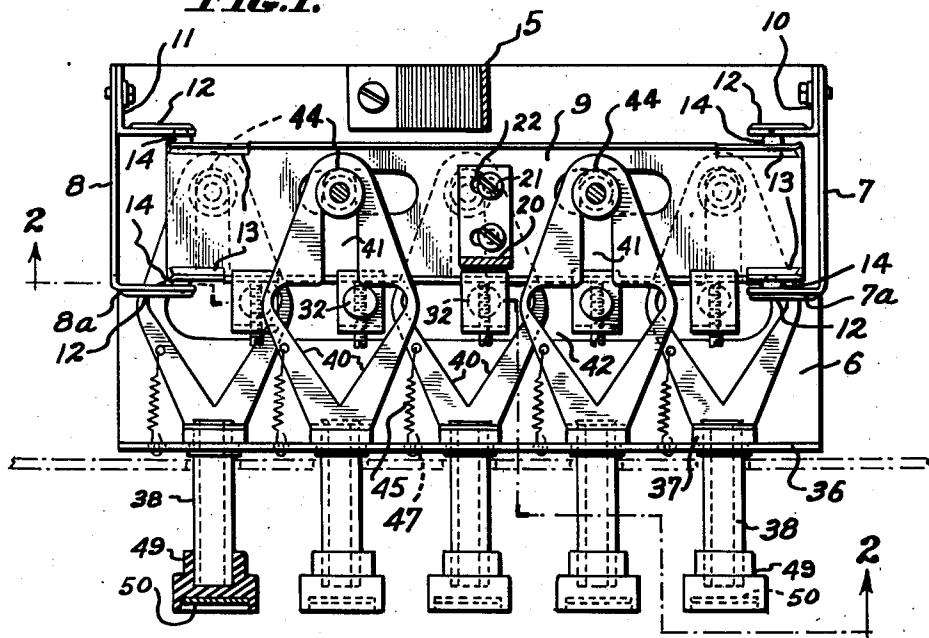
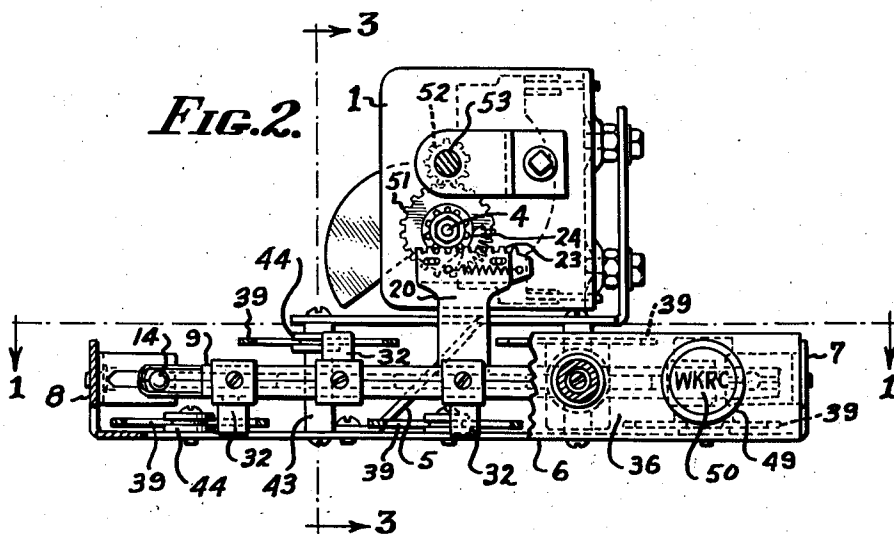


FIG. 2.



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2 Sheets-Sheet 2

FIG. 3.

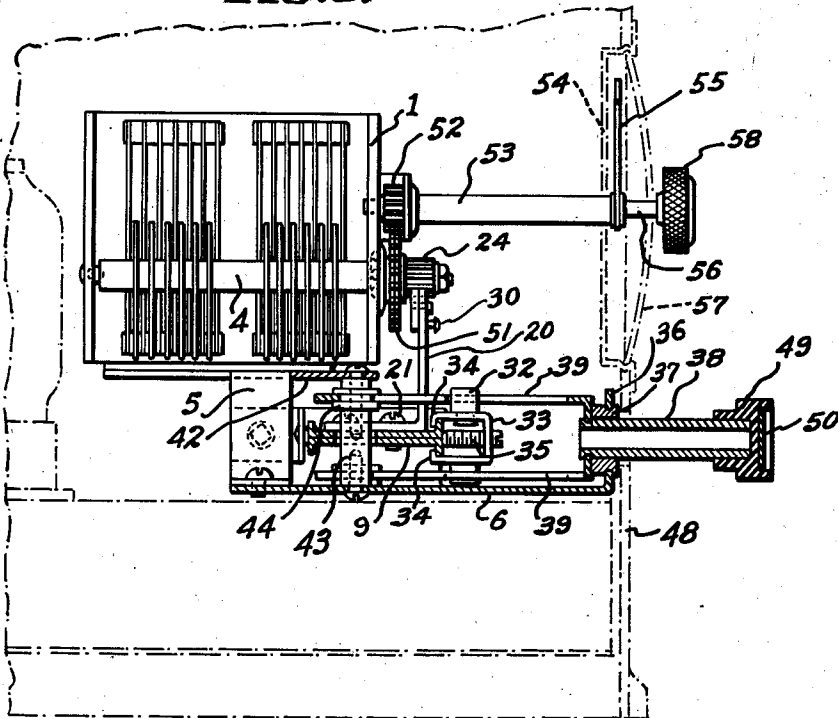


FIG. 4.

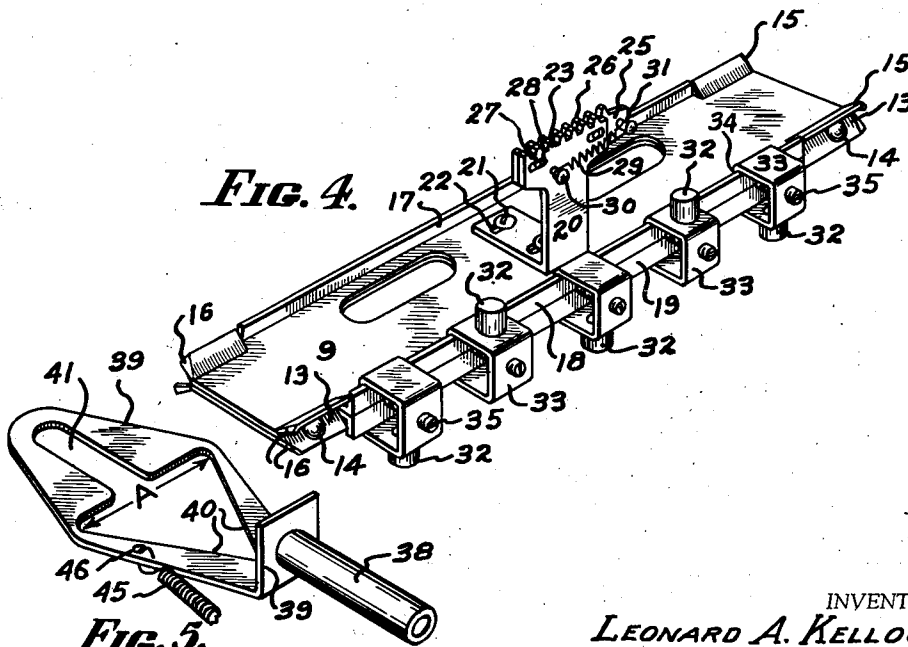


FIG. 5.

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UNITED STATES PATENT OFFICE

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RAPID SELECTOR MEANS FOR RADIO SETS
AND THE LIKE

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12 Claims. (Cl. 74—10)

My invention relates to mechanical means for tuning a radio set or other setttable apparatus to preselected settings or stations by the actuation of buttons or the like. Rapid tuning means have become very popular and have been made in two general forms. In one form a motor is provided to rotate the shaft of the condenser gang, and means in addition to the motor to determine the degree of rotation in accordance with the selective actuation of one of a number of handles, buttons, switches or the like. The other form is a mechanical form in which pressure applied by the operator selectively to a handle, button or rod, effects the rotation of the condenser drive shaft, and mechanism is provided in connection with the actuating device which determines the ultimate annular position of the condenser drive shaft.

My invention relates to the latter type of apparatus and has for its primary objects, first the provision of a mechanical actuator and selective mechanism which will be very accurate, even under conditions of long wear and usage. Second, my object is to provide a selective mechanism which is very inexpensive and simple to construct, being far less in cost than selective devices employing a motor and less in cost than any mechanical selective devices of which I am aware. A third object of my invention is the provision of a device which, while it has the aforementioned characteristics, is readily adjustable by the user of the set without requiring any special skill, so that the user of the set may make his own selection of stations, and change them as often as he may desire.

These and other objects of my invention which will be set forth hereinafter or which will be apparent to one skilled in the art upon reading these specifications, I accomplish by that certain construction and arrangement of parts of which I shall now describe an exemplary embodiment. Reference is made to the drawings wherein:

Figure 1 is a plan view of the mechanism with the condenser removed.

Fig. 2 is a sectional view taken along the lines 2—2 of Figure 1, but showing the condenser in place.

Fig. 3 is a vertical sectional view taken along the lines 3—3 of Fig. 2.

Fig. 4 is a perspective view of the carriage and certain associated parts.

Fig. 5 is a perspective view of one of the actuator members.

Briefly, in the practice of my invention, I provide a selective mechanism which comprises es-

5 sentially a framework, a carriage slidably mounted in the framework, a drive between the carriage and the part of the radio set to be tuned, e. g. the condenser gang, so that the longitudinal position of the carriage will determine the rotary position of the condenser drive shaft or the like, and selective means for rapidly determining a plurality of preselected longitudinal positions for the carriage. The selective means comprises 10 adjustable pins mounted in connection with the carriage and forked members movably mounted to slide in a direction transverse to the movement of the carriage, which members (by engagement with the pins) determine the preselected 15 positions of the carriage, moving the carriage when necessary to attain these positions.

It will be understood that modifications may be made in my structure or in associated parts, so that where I describe an exemplary embodiment having a particular condenser or a particular type of drive to the condenser, these are not to be regarded as limitations upon my invention, excepting where specifically claimed. In the exemplary embodiment which I shall describe, the carriage bears a rack meshing directly with a small pinion on the shaft of the gang condenser. By this arrangement, the necessary longitudinal motion of the carriage for a full half turn of the condenser shaft, is kept very 30 small.

In the several figures, 1 indicates a gang condenser as representative of a tuning instrumentality in the radio set, which is to be controlled by my selective mechanism. This gang condenser has an operating shaft 4. In the figures, for purposes of simplicity, the gang condenser is shown as mounted by means of a bracket 5 upon a base or semi-casing 6 for my selective apparatus. It will be understood by those skilled in the art that the gang condenser may be mounted upon the usual chassis of the radio set and my selective mechanism installed in the chassis as a separate unit, or built into the chassis during the construction thereof. As shown most clearly in Figure 1, the base 6 has side members 7 and 8, in connection with which a carriage 9, hereinafter to be more fully described, is mounted for longitudinal sliding movement. Variations in the type of mounting for the carriage may be made. It is advisable to provide a carriage mounting reasonably free from friction, as will be apparent. In the particular embodiment shown, ears 7a and 8a are turned over respectively upon the ends of the members 7 and 8. Bracket members 10 and 11 are at-

tached respectively to the members 7 and 8 and provide interspaced parallel ears. The several ears are provided with longitudinal grooves 12, which may conveniently be formed by stamping or drawing the metal; and the carriage 9 is provided with oppositely directed grooves 13. Small balls 14 engage respectively between the grooves of the carriage and the grooves of the ears, so that the carriage is mounted for limited, free, longitudinal movement but is not liable to displacement in other directions.

The carriage, in an exemplary embodiment, is shown most clearly in Fig. 4. It may conveniently be made of two pieces of sheet metal fastened in face-to-face relationship as by spot welding, brazing, or the like. End portions 15 of the edges of these pieces of sheet metal are bent up at an angle to form the grooves 13. Terminal portions of these parts may be bent as shown at 16 to confine the balls 14. Intermediate edge portions of the two metal parts may be bent oppositely, normal to the plane of the carriage, as at 17, 18 and 19 to form front and rear ribs. In the particular embodiment shown, a bracket 20 is attached to the carriage as by screws 21 threaded into the carriage and passing through slots 22 in the bracket. This gives a limited adjustment of the position of the bracket on the carriage. The bracket bears rack teeth 23, which mesh with a small pinion 24 (see Fig. 3) on the condenser shaft 4. In modern super-heterodyne radio sets, the tuning must be very accurate; and it is advisable, though not in all cases necessary, to provide against lost motion between the carriage and the condenser shaft. This may be done as shown by providing a member 25 having corresponding rack teeth 26, mounted on the bracket 20 slidably as by means of pins 27 in slots 28 on the bracket. A tension spring 29 engaging between a pin 30 on the bracket and pin 31 on the member 25, tends to bring the corresponding rack teeth out of line. When both members of the rack are in engagement with the pinion 24, this construction causes both sides of the teeth of the pinion 24 to be engaged tightly, thus preventing any lost motion. It will be clear from the construction which I have described that the position of the carriage 9 will determine the rotary position of the shaft 4. The particular way in which the shaft 4 is mounted in the condenser gang may be any desired. Also, as aforesaid, variations may be made in the drive between the carriage and the condenser shaft, or other drives adopted without departing from the spirit of my invention.

On the forward rib 18, 19 of the carriage 9, there are mounted in an adjustable fashion, various operating pins 32 by means of which the carriage may be moved. These pins are fastened to members 33 of substantial U-shape but having, as most clearly shown in Fig. 3, turned over portions 34 on the ends of the legs of the U, which turned over portions engage behind the rib members 18, 19. Small set screws 35 are threaded into the members 33 and serve to fix the position of these members, and consequently the position of the pins along the length of the carriage 9. The pins 32 are preferably small cylindrical metal studs which may be riveted or otherwise fastened to the members 33. Alternate pins, as shown, preferably extend in opposite directions. This enables me to locate certain of the actuating devices above the carriage, and certain of them below the carriage, whereby

room is saved and the necessary length of the carriage cut down.

The forward end of the base 6 is turned up as shown in Fig. 1 at 36; and at intervals the turned up portion is perforated and supplied with bearing grommets 37, in which tubular portions 38 of the actuating members are slidably mounted. As shown in Fig. 5, each actuating member comprises the tubular portion or plunger 38 and a metal member 39 having a body lying essentially in the same direction or plane as the plunger 38, and an ear 39 bent normal thereto. The plunger 38 is attached to this ear as by riveting; and the ear is perforated in line with the perforation in the plunger. The metal body 39 has a V-shaped cut-out 40 in the forward portion of it, the point of the V being in alignment with and extending toward the plunger 38. The other half of the metal body 39 is cut to provide a slot 41. The distance A between the wide end portions of the V-shaped cut-out should be at least as great as, and preferably somewhat greater than, the length of the desired longitudinal movement of the carriage 9.

The bracket member 5 bears an extension 42. Between this extension and the base 6 a series of posts 43 are mounted. These posts bear near their upper or lower ends respectively, small grooved and preferably rotatable pulley-shaped members 44 which engage in the slots 41 of the metal body 39. The actuator members thus are mounted for sliding movement in a direction normal to the direction of movement of the carriage 9, at the front by the engagement of the plunger 38 with the bearing members 37 and at the rear by the engagement of the pulleys 44 in the slots 41. The metal bodies 39 are, as has been explained, fairly wide; and while the actuator members may be and preferably are of identical conformation, alternate ones are turned upside down with regard to the others as is clearly shown in the drawings. This is for the purpose of minimizing space.

The pins 32 lie within the V-shaped cut-out portions of the metal bodies 39 of the actuator members. Small tension springs 45 engage between perforations 46 in the metal bodies 39 and perforations 47 in the front member 36 of the base. Thus the actuator members are normally kept pulled forward.

If any one of the plungers 38 is manually pressed inwardly, unless the pin 32 happens to lie directly opposite the point of the V, the pin will ride down one or the other of the sides of the V-shaped cut-out 40 until it comes to rest in the point of the V, the sides of the V-shaped cut-out contacting the pin at both sides. Thus the carriage is moved; and the positioning of the pin (and therefore the positioning of the carriage) is very accurate, by reason of the construction which has been described.

In the radio set, the plunger portions 38 will extend out through the front panel or wall 48 of the radio cabinet so as to be accessible to the operator. The several plungers are provided with buttons 49 for convenient manipulation; which buttons are preferably provided with marker disks 50. These disks can be marked with the call letters or other appropriate indicia for the stations selected.

In the particular embodiment which I have illustrated, the condenser shaft 4 is also provided with a gear 51, which also may be of the double spring pressed type to do away with lost motion. A pinion 52 on a shaft 53 meshes with the gear

51. The shaft 53 extends forwardly through a dial 54. Therebeyond, it may be provided with a pointer 55. An extension 56 of the shaft may pass through an appropriate hole in a cover glass 57 for the dial and may bear an operating knob 58. The gear 51 may be larger than the pinion 52, providing a vernier drive for the condenser gang. In the form illustrated, the shaft 4 turns through 180° only. If the ratio of the gear 51 to the pinion 52 is 2 to 1, the shaft 53 and the pointer 55 will thus rotate through a full turn, while the condenser shaft rotates through a half turn.

The mechanism which I have described does not interfere with the normal manual operation of tuning the radio set by means of the operating knob 58. The actuator members are normally held forwardly out of contact with the pinions 32. While it is necessary to move the carriage during the tuning of the radio set, the carriage is substantially free of friction. Yet when any one of the plungers 38 is depressed, it will rapidly and positively move the carriage to a predetermined position as has been explained.

To set the apparatus for the selection of a predetermined radio station, the cap member 49 is first removed from the plunger 38 which has been selected for that station, then the plunger is depressed bringing the pin 32 down into the point of the V. A long, thin screw driver is passed through the perforation in the plunger 38 and the set screw 35 is loosened thereby. Next, still holding the plunger 38 depressed, the radio set is manually tuned to bring in the desired station. During this operation the carriage 9 will be moved by the operation of tuning; but the member 33 which bears the pin 32 has been loosened and will therefore slide on the carriage until it attains a position appropriate to the station which has been tuned in. When this position has been attained, the screw driver is again used to tighten up the set screw 35, thus fixing the member 33 and its pin 32 in the desired position. Thereafter, when the plunger 38 is depressed, the carriage will always be moved to this predetermined position, thereby bringing in the station. Similar operations are carried through for the other plungers which have been provided and for other stations which are chosen for these plungers. The indicator disks 50 are appropriately marked and the caps 49 are placed on the plungers. The radio apparatus is then completely set for automatic tuning to the desired stations. However, should the operator at any time desire a different setting for a different station or stations, he may effect it by repeating the operations which I have described.

In the exemplary embodiment of my invention which I have illustrated and explained, five plungers are shown. It will be clear that this number may be varied up or down as desired with appropriate changes in the length of the carriage.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a radio set, a tunable mechanism, a carriage mounted for longitudinal movement, a driving connection between said carriage and said mechanism, a plurality of selective manually operative means for moving said carriage, and means adjustable on said carriage to predetermine the longitudinal positions to which said carriage is moved by said operative means.

2. In apparatus of the class described, a set-

table mechanism, a longitudinally moving carriage, a drive between said carriage and said mechanism, and selective means for moving said carriage to predetermined positions, said means comprising pins mounted in connection with said carriage and members moving in a direction transverse to the direction of movement of said carriage, said last-mentioned members having V-shaped portions adapted to engage said pins and move said pins until they come into the apex of said V, whereby to give to said pins predetermined positions.

3. In apparatus of the class described, a settable mechanism, a longitudinally moving carriage, a drive between said carriage and said mechanism, and selective means for moving said carriage to predetermined positions, said means comprising pins mounted in connection with said carriage and members moving in a direction transverse to the direction of movement of said carriage, said last-mentioned members having V-shaped portions adapted to engage said pins and move said pins until they come into the apex of said V, whereby to give to said pins predetermined positions, and means for adjusting the positions of said pins along the length of said carriage.

4. In apparatus of the character described, a member to be driven, a base, a carriage slidably mounted on said base, a driving connection between said carriage and said member to be driven, pins adjustably mounted on said carriage, actuator members mounted on said base for movement transverse to said carriage and means on said actuator members to engage and move said pins.

5. In apparatus of the character described, a member to be driven, a base, a carriage slidably mounted on said base, a driving connection between said carriage and said member to be driven, pins on said carriage, actuator members mounted on said base for movement transverse to said carriage and means on said actuator members to engage and move said pins, each of said last-mentioned means comprising a plunger, a metal body attached to said plunger and having a V-shaped cut-out therein, said body being so placed with reference to a pin on said carriage that said pin will be engaged by the sides of said V-shaped cut-out when said plunger is depressed.

6. In apparatus of the character described, a member to be driven, a base, a carriage slidably mounted on said base, a driving connection between said carriage and said member to be driven, pins on said carriage, actuator members mounted on said base for movement transverse to said carriage and means on said actuator members to engage and move said pins, each of said last-mentioned means comprising a plunger, a metal body attached to said plunger and having a V-shaped cut-out therein, said body being so placed with reference to a pin on said carriage that said pin will be engaged by the sides of said V-shaped cut-out when said plunger is depressed, said pins each being slidably mounted on said carriage by means of a bracket having a set screw, said plunger being hollow and said set screws being accessible for operation through the hollow portions of said plungers.

7. In apparatus of the character described, a member to be driven, a base, a carriage slidably mounted on said base, a driving connection between said carriage and said member to be driven, pins on said carriage, actuator members mounted on said base for movement transverse to said

carriage, means on said actuator members to engage and move said pins, each of said last-mentioned means comprising a plunger, a metal body attached to said plunger, and having a V-shaped cut-out therein, said body being so placed with reference to a pin on said carriage that said pin will be engaged by the sides of said V-shaped cut-out when said plunger is depressed, said pins each being slidably mounted on said carriage by means of a bracket having a set screw, said plunger being hollow and said set screws being accessible for operation through the hollow portions of said plungers, and means for manually operating said driven member, whereby upon loosening a pin, said driven member may be given a setting manually while said pin is held in said V-shaped cut-out and said pin may thereafter be tightened in an appropriate position on said carriage.

8. In apparatus of the character described, a carriage, means for mounting said carriage for longitudinal movement, pins adjustably mounted on said carriage and actuating means for said carriage comprising members having movement transverse to the movement of said carriage, said members having V-shaped cut-out portions therein through which said pins extend, said cut-out portions having a width at their large end at least as great as the range of movement of said carriage, and resilient means for retaining said actuating members normally in such position that the said pins lie in the wide portion of said V.

9. Apparatus as claimed in claim 8 including a base, ears on said base for mounting said carriage, said ears having grooves, said carriage having at its ends corresponding grooves, and balls engaging between said grooves respectively, so as to mount said carriage for free, limited longitudinal movement.

10. Apparatus as claimed in claim 8 including a base, ears on said base for mounting said carriage, said ears having grooves, said carriage having at its ends corresponding grooves and balls engaging between said grooves respectively, so as to mount said carriage for free, limited

longitudinal movement, said actuating members in addition to said bodies having plungers attached thereto, a turned up portion on the front of said base, bearings for said plungers therein, and bearing portions mounted on said base for the rear ends of said bodies.

11. Apparatus as claimed in claim 8 including a base, ears on said base for mounting said carriage, said ears having grooves, said carriage having at its ends corresponding grooves, and balls engaging between said grooves respectively so as to mount said carriage for free, limited longitudinal movement, and actuating members having bodies, said actuating members in addition to said bodies having plungers attached thereto, a turned up portion of the front of said base, bearings for said plungers therein, bearing portions mounted on said base for the rear ends of said bodies, said bodies having said V-shaped cut-out portions in their forward ends and in their rearward ends, slot-shaped cut-out portions, said last-mentioned portions engaging said last-mentioned bearing portions.

12. In a radio apparatus, a variable tuning element requiring different degrees of angular movement to tune said apparatus to separate selected frequencies, a rotor shaft on which said tuning element is mounted, driven means for rotating said shaft through its entire range of movement, a plurality of pre-set adjustable stops on said driven means, said stops being individual to said separate frequencies and spaced from each other different distances as determined by the different degrees of movement required by said driven means to rotate said shaft from any given position to any of said selected positions, a plurality of movable stop engaging members individual to said stops for selectively applying an actuating force to said driven means, and means operable at the limit of movement of the selected stop engaging member for locating its stop and hence said driven means, rotor shaft, and variable tuning element at the position whereat the selected frequency is achieved.

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