Dec. 1, 1931. R. C. ENDERWOOD 1,834,272

RADIO TUNING APPARATUS

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Fig. 1

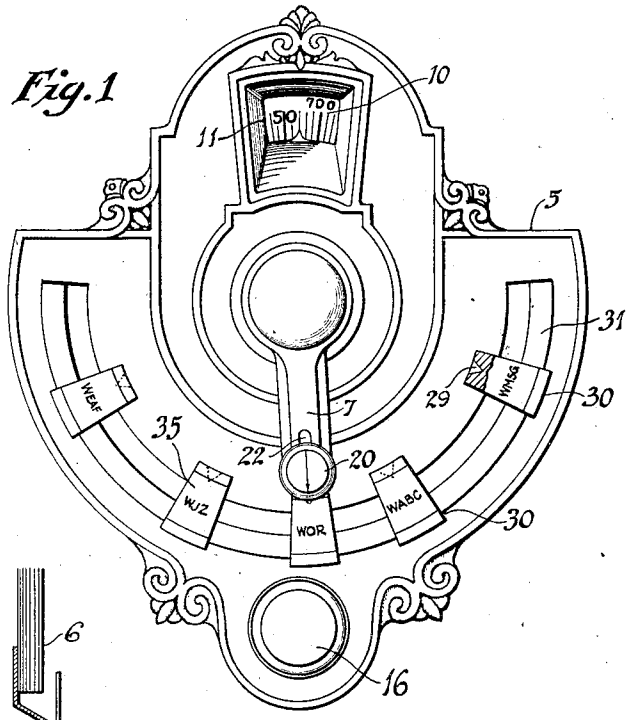


Fig. 2

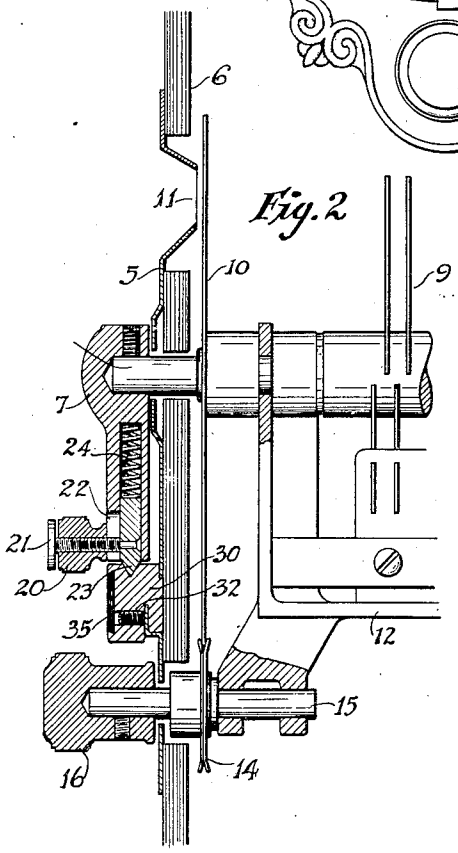


Fig. 3

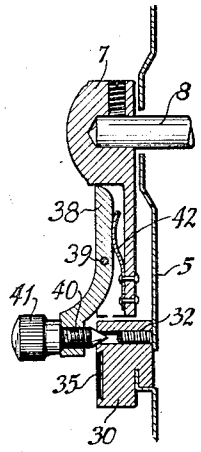
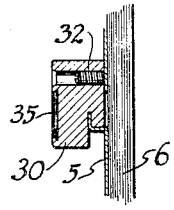


Fig. 4



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RADIO TUNING APPARATUS

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Fig.6.

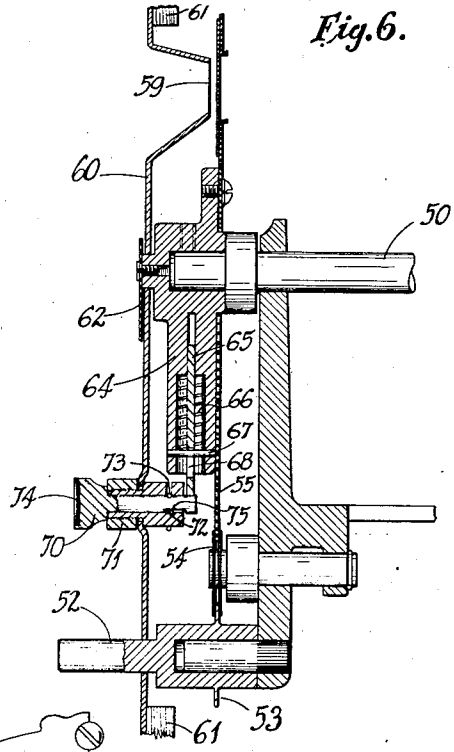
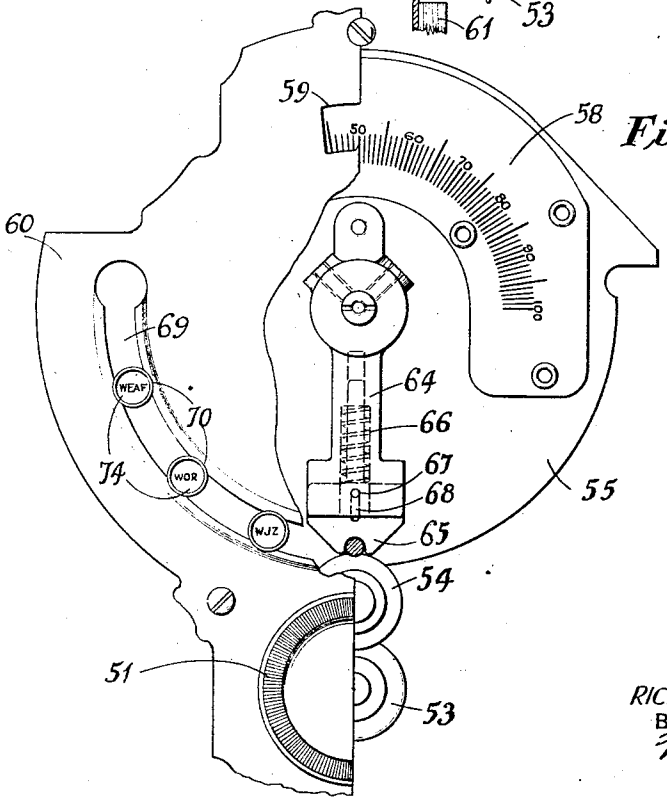


Fig.5.



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UNITED STATES PATENT OFFICE

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RADIO TUNING APPARATUS

Application filed March 25, 1929. Serial No. 349,707.

This invention relates to means for adjusting or tuning radio receiving apparatus and particularly to means for automatically selecting certain definite radio broadcast frequencies.

An object of the invention is to simplify the tuning of radio receivers and to facilitate the locating of any desired broadcast wave lengths.

Another object of the invention is to provide a tuning system which may be operated as efficiently and effectively by a non-skilled operator as by one familiar with the method of locating broadcasting stations.

A further object of the invention is to provide a method of and means for tuning radio receiving sets which reduces the time required for tuning in any station over that which has heretofore been necessary with the usual type of radio receiver tuning apparatus.

A feature of the invention is that it is adaptable to any of the well known types of radio receiving systems.

Another feature of the invention is that it is a simple unitary control capable of manufacture at a small cost.

To accomplish the foregoing objects, the tuning mechanism is substantially in the form of the well known radio receiver dial, with the advantage of enabling the operator to select a radio broadcast wave length in a single positive movement of the dial or control arm without the usual oscillating manipulations usually required for finding any particular station. Furthermore, by locating a station wave length quickly and accurately, a saving in operating power is accomplished since the power necessary for any desired volume may be reduced to a minimum for the particular station being received. This prevents the reception of a station at the same volume level when not tuned in at the most efficient point of adjustment, at the expense of an increased power input. In the present invention, this minimum power input may be determined readily and accurately to prevent the receiving set being operated in an inefficient manner.

Other features and advantages of the invention will be apparent and more fully understood by reference to the accompanying drawings in which:

Fig. 1 is a front elevational view of a particular type of dial embodying the invention;

Fig. 2 is a cross sectional view of the dial of Fig. 1;

Fig. 3 is a modification of the locking arrangement of the dial shown in Figs. 1 and 2;

Fig. 4 is a cross sectional view of a portion of the locking stop shown in Fig. 3;

Fig. 5 is a front elevational view of a modification of the dial and stop arrangement with parts broken away; and

Fig. 6 is a cross sectional view of the modification of Fig. 5.

Referring to Figs. 1, 2, 3 and 4 in detail wherein corresponding numerals refer to similar elements of the invention, an escutcheon plate 5 is shown mounted on any well known type of radio receiver panel 6. A main operating arm 7 is fixedly and directly attached to rotatable shaft 8 which carries a variable tuning condenser 9 supported on a frame 12. The main control arm and condenser are shown mounted on the same shaft but it is to be understood that any well known drive may be employed such as a belt and pulley combination, a gear train or a friction drive. Also, the condenser 9 is representative of a gang condenser unit or other variable tuning elements of a radio receiver. Attached to shaft 8 is a driving disc 10 which has on its face, wave length indications as shown in Fig. 1. These indications are visible through an aperture 11 in the escutcheon plate 5.

Although the condenser 9 is to be generally controlled by the arm 7, it may be adjusted through the disc 10 in any suitable manner such as by a vernier friction wheel 14 mounted on a rotatable shaft 15 manually operated by an adjusting knob 16. The condenser 9 may now be adjusted and controlled by either the knob 16 through the friction wheel train 14 and 10 or directly through the operating arm 7 by means of a main adjusting knob 20. However, when the tuning apparatus has been once adjusted, tuning in accordance with the invention as shown in Figs. 1, 2, 3 and 4 will be accom-

plished by means of the knob 20, the friction wheel 14 offering substantially no deleterious braking effect on the disc 10.

The knob 20 is mounted on a threaded screw 21 permitting the knob to be tightened against the arm 7. When the knob 20 is not so tightened it and the screw 21 may be moved radially along the arm 7 in a slot 22 carrying therewith tapered pin 23 which is held extended by a spring 24 located in a radial slot within the arm 7.

The pin 23 is adapted to engage a plurality of stops or tabs 30 having recesses 29 therein, the stops being placed in a circumferential path 31 in the escutcheon plate 5. The stops are adjustable along the path 31 but may be fixedly attached to the escutcheon plate at required points by any suitable means such as set screws 32. These stops may be placed at points along the path 31 which, when the pin 23 is inserted in one of the recesses 29, the condenser 9 will be in a position to permit the reception of a particular station. The stops 30 may be designated by indicator cards 35 inserted in recesses in the faces of the stops.

When these stops have been adjusted so that, when the control arm is engaged therewith, certain stations will be received, these stations may be tuned in by the single operation of moving the operating arm 7 to the tab designating the particular station desired and allowing the spring 24 to insert the pin 23 in the receiving recess of the respective tabs.

When it is desired to locate a new station, for which the location of a tab has not been predetermined, the knob 20 may be moved radially toward the shaft 8 until the pin 23 is clear of the recess 29 and then tightened against the arm 7. The shaft 8 may now rotate freely under the control of the vernier knob 16, or, in case rapid manipulation is desired, under control of the arm 7.

Any number of stops up to the capacity of path 31 may be employed, the stops being of any suitable shape although preferably of a keystone or a wedged shape pattern as shown to permit of a greater number being utilized within the confines of the path provided. It may also be desirable to have a reduction drive of two to one between the arm 7 and condenser 9 permitting the arm 7 to rotate 360 degrees to the 180 degree angular travel of the condenser. With this arrangement, a greater number of stops may be used, the path 31 now forming a complete circle. This arrangement will permit the use of stops for stations having carrier frequencies located near each other.

It is also within the contemplation of this invention that with a particularly selective receiver, two or more control arms similar to arm 7 may be extended from the control shaft to enable the logging of a distant station having a carrier frequency very near that of a previously logged local station. To accomplish this control, an auxiliary arm may engage a stop on an unused portion of the path 31, which will move the originally locked arm less than the width of a stop.

Although any method may be used to position a stop for a particular station, it is preferable to proceed by locking pin 23 in a release position, adjusting tuning element 9 to its exact position by means of vernier knob 16, moving a stop to an engaging position with arm 7, and then fastening the stop to the escutcheon plate 5 by the set screw 32. The indicator card 35 may now be snapped into the face of the stop. If subsequently that particular station is desired brought in, one movement of the arm 7 to the stop is all that is required.

In the modification of the locking arrangement shown in Figs. 3 and 4, the operating arm 7 has mounted thereon a lever 38 pivoted on a fulcrum 39. The locking recesses of tabs 30 are placed in their faces and a threaded pin 40 is adapted to be inserted therein under control of a knob 41. The pin 40 is held in any particular recess by means of a spring 42. To remove the pin and release the operating arm 7, it is only necessary to pull the knob 41 toward the operator. The shaft 8 may now be rotated to another stop or to any other position desired. A slight turn of the knob 41 removes the pin 40 from the tab 30 and locks it in the release position to enable the condenser to be operated by means of the vernier knob 16.

In Figs. 5 and 6 adjustment of a shaft 50 is controlled by a knob 51 through shaft 52, friction wheels 53 and 54 and a friction disc 55, the disc being mounted on the shaft 50. The disc 55 has thereon a scale 58 indicating wave lengths or frequencies within the broadcasting range which may be viewed through an aperture 59 in an escutcheon plate 60 mounted on a panel 61. The friction wheel 54 is for the purpose of imparting to the disc 55 the same direction of rotation as that of the control knob 51.

In this embodiment of the invention a control arm 64 mounted on shaft 50 has located therein a flat notched pin 65 which is held extended by a coil spring 66. The pin is limited in its travel by a key 67 fixedly attached to the arm 64 and confined within the limits of a slot 68 in the pin 65. The arm 64 is similar to the arm 7 of Fig. 1 except that it is located behind the escutcheon plate and is operated through its shaft instead of its shaft being operated through it. The angular position of the arm 64 may be indicated on the panel by a pointer 62.

The stops 30 of Fig. 1 are now in the form of push buttons 70 which may be attached to the escutcheon plate 60 in a circumferential path 69 therein by a nut 71. These buttons

are limited in their motion, when once located, by the dimensions of slots 75 working against a key 72. Snap keys 73 hold the buttons in position. Station indicating cards 74 are snapped in the faces of the buttons 70. A method of locating these buttons at positions in the path 69 corresponding to tuning points of the stations frequently desired is substantially the same as the method employed in locating the stops 30 of the system shown in Fig. 1.

To operate the tuning system shown in Figs. 5 and 6, when once a button has been positioned, it is only necessary to push in that particular button and rotate the knob 51 until the disc 55 stops. The station represented by that button is then tuned in accurately. The rotation of the disc 55 is stopped when the shaft of the button 70 has been fitted in the notch of the pin 65. This is accomplished by the action of the spring 66 forcing the notch of the pin 65 over the button shaft when the arm 64 has brought the pin to the correct position.

The pin spring 66 is compressed when the pin is forced against it by the end of the button shaft. When a different station is desired brought in, it is only necessary to pull the button outward to release the arm 64 which may be now rotated to another button stop.

It is to be noted, that the method of locating broadcasting stations with a tuning mechanism embodying the above described invention is reduced to push button control when once adjusted to receive certain frequently desired stations. That is, any person unfamiliar with the usual method of oscillatory tuning of radio sets may move the knobs 20, 41 or 51 according to the modification being employed, to the stop or button representing the station designated by the indicator card and that station will be properly tuned in. It is then a simple matter to regulate the volume of the receiver to meet the particular circumstances under which the reception is being had.

With the modification of Figs. 5 and 6 it is unnecessary to pay any attention to stopping the tuning element at a particular stop since this is performed automatically as described above.

While this specification has described specific embodiments of the invention, it is to be understood that modifications may be made and that no limitations are intended other than those imposed by the scope of the appended claims.

What is claimed is:

1. In a station finder for a radio receiver having a variable tuning element, the combination of, a control arm associated with said tuning element, adjustable stops for positioning said control arm at predetermined locations, and means resiliently mounted on said arm for locking said arm to said stops.

2. In a station finder for a radio receiver having a rotatable operating shaft and a tuning condenser, the combination of an adjusting arm for said condenser, said condenser and arm being associated through said shaft, a plurality of adjustably positioned indicator stops adapted to cooperate with said arm, and resilient means for engaging said arm with said stops.

3. In a station finder for a radio receiver having a variable tuning element, the combination of a control arm for adjusting said element, said arm having a reciprocating element mounted thereon, and a plurality of adjustable stops for engaging said reciprocating element in one position of said element, said stops being positioned so as to adjust said tuning element at predetermined locations when said arm is engaged with said stops.

4. In a tuning system for a radio receiver having a variable tuning element, the combination of a control arm for adjusting said element, a rotatable shaft associating said element with said control arm, a plurality of adjustable stops adapted to engage said arm in certain predetermined positions, independent means for adjusting said element, and means for locking said control arm to said stops in said predetermined positions and releasing said arm therefrom to enable said tuning element to be operated by said independent means.

5. A radio tuning system in accordance with claim 4 in which said independent means comprises a friction wheel train having a disc mounted on said shaft.

6. A radio tuning system in accordance with claim 4 in which said locking and releasing means comprises a reciprocating element adapted to engage one of said stops when in a locking position.

7. In a radio system having a rotatable shaft with a variable tuning element mounted thereon, the combination comprising, a control arm for adjusting said tuning element, said arm and element being associated through said rotatable shaft, a plurality of adjustable stop blocks for engaging said control arm, a second rotatable shaft, means for controlling the rotation of said first shaft by rotation of said second shaft, and means for locking said first shaft in predetermined positions corresponding to the locations of said stop blocks.

8. A radio tuning system in accordance with claim 7 in which said controlling means comprises a friction wheel train.

9. In a radio broadcast receiving set having a unitary tuning system and means for adjusting said tuning system, means including adjustable stop members adapted to be set at predetermined positions corresponding to exact broadcast station frequencies and adapted to lock said adjusting means when

said tuning system is adjusted to said station frequencies.

10. In a radio broadcast receiving set having a unitary tuning system, the combination comprising, an escutcheon plate mounted on said set and having a circumferential path, an arm for adjusting said tuning system, and means for engaging said arm in adjustably predetermined positions corresponding to exact broadcast station frequencies, said means comprising stop blocks fastened to said escutcheon plate in said circumferential path.

11. In a radio broadcast receiving set having a unitary tuning system, the combination comprising, an escutcheon plate mounted on said set and having a circumferential path, a plurality of adjustable stop blocks located in said path, an arm for controlling said tuning system, means for locking said control arm to said stop blocks to position said tuning system at exact broadcast station receiving frequencies, and auxiliary means for adjusting said tuning system independently of said control arm.

12. In a radio broadcast receiving set having a unitary tuning system mounted on a rotatable shaft, the combination of a rotatable member on said shaft, an element mounted on said member and adapted for limited movement radially with respect thereto and adjustable means engaging said element for stopping said shaft at predetermined positions corresponding to definite broadcast frequencies.

13. The combination defined in claim 12 in which said engaging means comprises manually operated buttons for locking said rotatable member thereto when in an engaging position.

14. In a radio broadcast receiving set having a tuning system mounted on a rotatable shaft, the combination of a rotatable member associated with said shaft, an element mounted on said member and adapted for limited movement radially with respect thereto and a plurality of adjustable stops in predetermined positions corresponding with definite broadcast frequencies adapted to engage said element, said stops when in a forward position locking said shaft, and when in an outward position releasing said shaft.

In witness whereof, I hereunto subscribe my name this 22nd day of March, A. D. 1929.

RICHARD C. ENDERWOOD.