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MEANS FOR CONTROLLING WIRELESS RECEIVING APPARATUS

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2 Sheets-Sheet 1

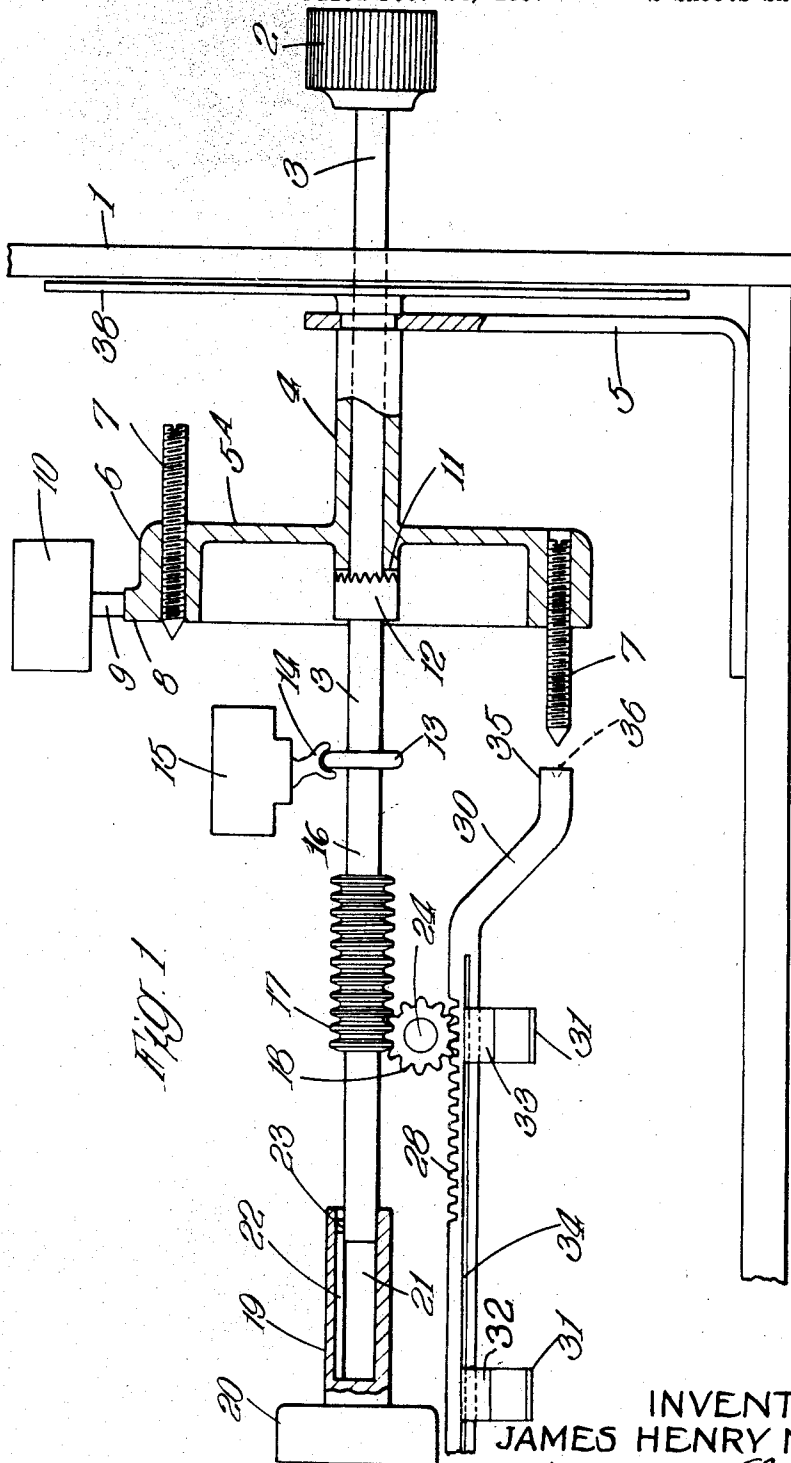


Fig. 1

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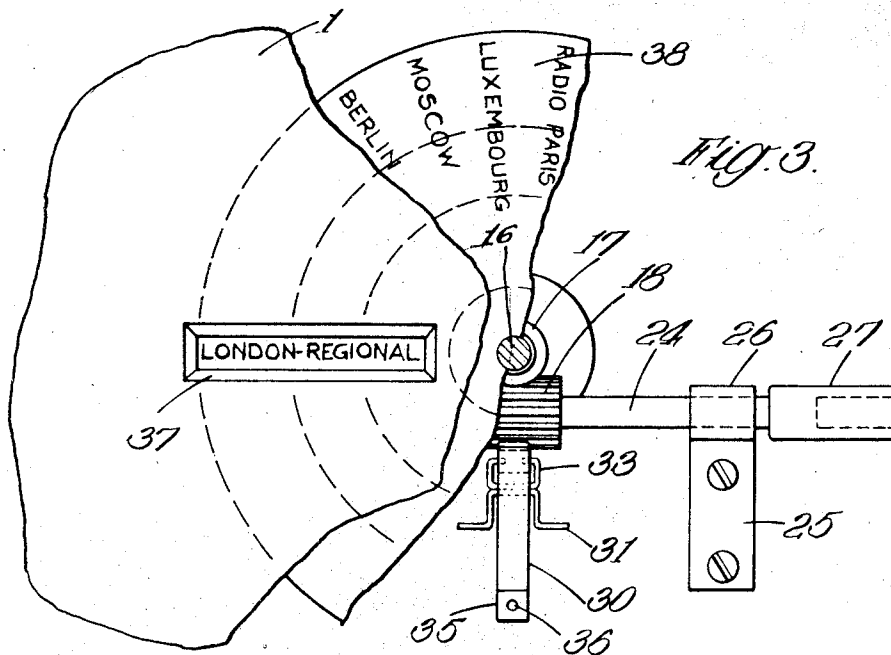
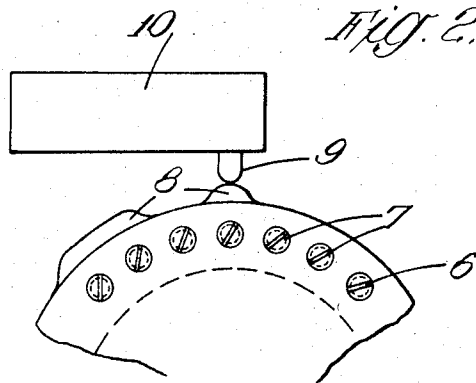
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UNITED STATES PATENT OFFICE

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MEANS FOR CONTROLLING WIRELESS
RECEIVING APPARATUS

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7 Claims. (Cl. 250—20)

This invention relates to means for tuning wireless receiving apparatus.

In general, with wireless or like receiving apparatus, it is highly desirable that the apparatus for controlling the tuning means should be as simple as possible, so that a person wishing to obtain reception of a particular broadcasting station should have to operate only a few control devices, or preferably one, in as simple a manner as possible.

It is the chief object of the invention to afford such apparatus for controlling the tuning means of a wireless or like receiver, and in accordance with the invention a control head is arranged for rotation to any of a number of predetermined positions, the control head being capable of axial movement, the extent of which is limited according to the initial position of angular adjustment, the tuning means being operated by the axial movement of the head, so that said tuning means is adjusted to a particular point according to what initial angular position of the control head is chosen.

The muting switch may be operated from the control head (which may be in the form of a normal hand control knob) whereby the axial movement thereof after the angular selective movement has been performed, whereby such angular setting movement is performed with the receiver muted and normal working of the receiver is resumed only after the axial movement of the control head has taken place. Furthermore, the rotary movement of the control head during the time when the angular setting is being made, may also be used to set the particular desired wave-length in accordance with the desired setting of the tuning means. Volume control may, if desired, be also operated from the rotary movement of the control head after the latter has been moved axially to perform the setting of the tuning means, so that when desired by following the principles of the present invention, a wireless receiver may be provided which is controllable from a single knob or control head. The main switch for turning the receiving set on and off is, however, preferably, a separate unit, but clearly this will not lead to complications or objections as to the number of various controls required for a wireless receiving set equipped with the apparatus of the invention.

In order that the said invention may be clearly understood and readily carried into effect, the same will now be described more fully with reference to the accompanying drawings, in which:

Figure 1 is a partly sectional side view of apparatus embodying the invention,

Figure 2 shows a detail of the mechanism of Figure 1, and

Figure 3 is a fragmentary front view of the apparatus of Figure 1.

In the illustrated example, the apparatus of the invention is applied to a wireless receiving apparatus having a control panel 1 at the exterior side of which the control knob 2 is arranged. The knob 2 is carried on a shaft 3 which passes through the panel 1 and extends through a sleeve 4. The sleeve 4 is supported for turning movements by a bracket 5, which may be secured to some convenient part of the wireless receiving apparatus, such as the base-board thereof.

The sleeve 4 is formed with a disc-like portion 5A which has a peripheral flange 6. The flange 6 has a number of apertures formed in it, these apertures being internally screw-threaded to receive threaded pins 7 (see Figure 2). The peripheral face of the flange 6 is formed with cams 8 adapted to co-operate with the actuating member 9 of a wave-change switch 10, in a manner which will be explained more fully hereinafter.

The sleeve 4 is normally freely rotatable upon the shaft 3 so that upon turning of the latter, no rotary displacement is imparted to the sleeve. The sleeve is, however, extended beyond the disc-like portion 5 and is formed with a toothed or serrated end portion 11 which may be engaged with a similarly toothed or serrated collar 12 carried on the shaft 3 or formed integral therewith. In addition to the collar 12, the shaft 3 carries a further collar 13 adapted to co-operate with the actuating arm 14 of a muting switch 15, the purpose of the latter being referred to hereinafter. Adjacent the collar 13 there is upon the shaft 3 a circularly grooved portion 16. The portion 16 acts as a rack, the grooves therein being regularly spaced to form rack teeth 17. Each tooth 17 is completely circular and may engage with a pinion 18, so that if the shaft 3 is turned, and with it the portion 16, any teeth 17 engaging the pinion 18 will not cause movement of the pinion 18, the teeth 17 merely sliding through the teeth of the pinion 18. The circular rack 16 is secured upon the shaft 3 so as to move always with the latter.

The inner extremity of the shaft 3 enters a sleeve 19 formed as an extension of the operating member of a volume control. The bore 21 of the sleeve 19 has an internal keyway 22 into which there engages a pin or key 23 secured upon

the shaft 3. Thus, the latter may be moved relatively to the sleeve 19 in an axial direction whilst the shaft may be at any time angularly displaced to produce similar angular displacement of the sleeve 19. The volume control 20 may be of the potentiometer type.

The pinion 18 is carried upon a shaft 24 (see Figure 3) which is supported by a bracket 25 having a bearing 26 embracing the shaft. The extremity of the shaft 24 remote from the pinion 18 has a coupling member 27 secured to it for the purpose of connecting the shaft with the tuning condenser or ganged tuning condensers, or other tuning means of the wireless receiving apparatus. The pinion 18, as indicated above, engages at one side the teeth 17 of the circular rack portion 16. At a diametrically opposite point, the teeth of the pinion 18 engage with rack teeth 28 formed upon a bar 30. The latter is supported for sliding movements by a pair of brackets 31 having claws 32 and 33 engaging the bar 30 on opposite sides, the bar being for this purpose formed with lateral grooves 34. The forward end of the bar 30 is inclined downwardly to the extremity 35 which has a small central hollow 36 intended for the engagement of the point of the pins 7.

The apparatus described above will be understood to operate in the following manner. By manipulation of the control knob 2, the shaft 3 may be axially displaced to bring the shaft into the position shown in Figure 1 for example. In this case, the switch 15 has its operating member 14 brought to a position where the switch is operative to prevent audible output from the loudspeaker or the like of the wireless receiving apparatus and for this reason the switch may be referred to as a muting switch. The collar 12 has its toothed side in engagement with the toothed end of the extension 11, on the sleeve 4, so that rotational movements of the knob 2 will produce angular displacement of the disc 5a with the associated flange 6. In this manner, a particular angular setting of the disc may be obtained so that one of the pins 7 is opposite the extremity 35 of the bar 30. Similarly one of the cams 8 may be correspondingly engaged with the actuating member 9 of the wave-change switch 10. During rotational movement of the knob 2 when in its outer position, the circular rack teeth 17 will have no effect on the pinion 18. The rotation of the shaft 3 may, however, operate the volume control 20 although this will not be apparent to a listener, since the muting switch 15 will still be in its position in which it precludes audible output from the loudspeaker.

In order now to bring the wireless receiver into operation, it is necessary for the operator to press the knob 2 inwardly whereby the collar 12 and extension 11 of the sleeve 4 become disengaged, the muting switch 15 is turned to a position where it allows audible output from the loudspeaker and simultaneously the circular rack 16 produces rotation of the pinion 18. The latter causes the bar 30 to be moved linearly, and the rotation of the pinion 18 is arrested only when the extremity 35 of the bar 30 contacts with the end of that one of the pins 7 which has initially been positioned opposite the extremity 35. The pins 7 are set to project various distances from the flange 6, so that the distance which the shaft 3 may be pushed inwardly is determined by the initial angular adjustment of the disc-like member 5a, to bring a particular pin 7 opposite the extremity 35 of the bar 30. The shaft 24 is con-

nected with the condenser, or ganged condensers, or other tuning arrangements of the wireless receiving set, so that in effect the initial choice of a particular screw 7 determines the angular adjustment of the condenser or condensers or like tuning means of the wireless receiver. The settings of the screw-threaded pins 7 must, of course, be determined in regard to the wave-length at which the receiver is operating. A coordination between these settings and the positioning of the cams 8 may be easily envisaged, so that when the correct tuning setting for a long-wave station, for example, is derived by means of choice of the correct pin 7, a cam 8 may then register with the member 9 to bring the wave-change switch 10 into a corresponding position.

As already indicated, during the initial angular setting of the knob 2, the volume control 20 might have been brought to any random position. During the initial setting of the knob 2 this is of no importance, but after the axial displacement inwardly of the knob 2 and the consequent operation of the muting switch and the tuning of the receiver, the volume control 20 may be operated without simultaneous operation of any other component. Such operation is obviously derived merely by rotation of the knob 2. If it so happens that the volume control 20 is in its minimum position, a rotational movement of the knob 2 in, for example, clockwise direction will allow the output of the receiving apparatus to be brought to a normal working volume. Preferably an arrow is made on the knob 2 to indicate the direction of turning to increase output volume. The component 20 is such that its control member 19 may be rotated freely without encountering a limit position for reason of convenience in adjustment of the disc member 5 during the time when the setting of the component 20 is of no concern.

For the purpose of pre-selecting which particular broadcast station shall be received on the wireless receiving apparatus, many different visual indicating means may be employed. As will be readily appreciated, it is necessary to have an indicating means operating in co-ordination with the setting of the disc-like member 5 to show the name of the transmitting stations which correspond to the various combinations of settings of the tuning means and positioning of the wave-change switch 10, available with the apparatus. A convenient indicating means is illustrated, by way of example. An aperture 37 is formed in the panel 1 and there is a disc 38 secured to the sleeve 4. On its face adjacent the inside of the panel 1, the disc 38 bears indications of various transmitting stations, so that such indications may come within the area of the aperture 37.

It will be readily understood that instead of having the disc 38 and aperture 37, there might be a pointer arm operated from the sleeve 4 and working over the exposed scale, showing all the receiving stations to which the receiver may be tuned by means of the described apparatus.

Constructional modifications of the described apparatus are easily envisaged. Thus, for example, instead of having the collar 12 serving as a clutch to engage the end of the sleeve 4, the connection between the shaft 3 and the sleeve 4 might be obtained with the aid of longitudinal splines on the shaft 3 with corresponding keyways in the sleeve 4 so that the sleeve 4 will be effected only by rotational movements of the knob 2 and not by longitudinal axial movements there-

of. Alternatively, a friction connection between the shaft 3 and the sleeve 4 may be employed. Similarly, the connection between the shaft 3 and the component 20 might be the subject of a mechanical variation.

What I claim and desire to secure by Letters Patent of the United States is:

1. Apparatus for operating the tuning means of radio and like receivers, comprising a control head, mechanism for adjusting the tuning means, a first mechanical connection between said control and said mechanism to permit the latter to be operated from the former, a pre-selector device having abutment means arranged to project varying distances therefrom, a second mechanical connection between said control head and said pre-selector device, to permit the latter to be angularly adjusted, a member associated with the mechanism for operating the tuning means, such member being displaced always a distance proportional to the displacement experienced by said tuning means and said member being disposed so as to have its displacement limited selectively by the abutment means of said pre-selector device according to the position of angular adjustment of the latter, means in association with said control head to allow the latter to be operated selectively either to angularly adjust the pre-selector device or operate said mechanism actuating the tuning means, cams arranged in association with the pre-selector device and a wave-change switch for control by said cams, said cams being disposed in relation to the abutment means of the pre-selector device so that the abutment means may correctly limit the adjustment of the tuning means whilst the cams correspondingly set said wave-change switch.

2. Apparatus for operating the tuning means of radio and like receivers, comprising a control head arranged for angular and axial movement, a shaft carrying said control head, a mechanical connection on said shaft responsive to the axial movement thereof but not to the rotary movement, said mechanical connection operatively communicating with the actuating member of the tuning means, a pre-selector device having abutment means arranged to project varying distances therefrom and being disposed on said shaft, a disengageable connection between said shaft and pre-selector device to allow the latter to be turned by the shaft, but to be free therefrom on axial movement of the said shaft, a displaceable member which is arranged to move a distance proportional to the extent of adjustment of the tuning means, and which is disposed so as to have its travel limited by contact with one of the abutment means that has been selectively chosen by an angular movement of the pre-selector device whereby to similarly limit the extent of adjustment of said tuning means, cams upon said selector device and a wave-change switch arranged to be operated by said cams, the latter being disposed correspondingly in relation to the abutment means whereby the wave-change switch is automatically operated according to the abutment means chosen to limit the travel of said movable member.

3. Apparatus for operating the tuning means of radio and like receivers, comprising a control head arranged for angular and axial movement, a shaft carrying said control head, a mechanical connection on said shaft responsive only to the axial movement thereof, said mechanical connection operatively communicating with the actuating member of the tuning means, a pre-selector

device having abutment means arranged to project varying distances therefrom and being disposed on said shaft, a disengageable connection between said shaft and pre-selector device to allow the latter to be turned by the shaft, but to be free therefrom on axial movement of the said shaft, a displaceable member arranged to move a distance proportional to the extent of adjustment of the tuning means and which is disposed so as to have its travel limited by contact with one of the abutment means which has been selectively chosen by an angular movement of the pre-selector device whereby to similarly limit the extent of adjustment of said tuning means, cams upon said selector device, a wave-change switch arranged to be operated by said cams, the latter being positioned to allow the wave-change switch to be automatically operated according to the abutment means selectively chosen to limit the travel of said movable member, a muting switch and an element secured on said shaft for operating the muting switch.

4. Apparatus for operating the tuning means of radio and like receivers, comprising a control head arranged for angular and axial movement, a shaft associated with said control head, a mechanical connection on said shaft responsive only to the axial movement thereof, said mechanical connection operatively communicating with the actuating member of the tuning means, a pre-selector device having abutment means arranged to project varying distances therefrom and being disposed on said shaft, a disengageable connection between said shaft and pre-selector device to allow the latter to be turned by the shaft, but to be free therefrom on axial movement of the said shaft, a movable member arranged to move a distance proportional to the extent of the adjustment of the tuning means and which is disposed so as to have its travel limited by contact with one of the abutment means which has been selectively chosen by angular movement of the pre-selector device whereby to similarly limit the extent of adjustment of said tuning means, cams upon said selector device, a wave-change switch arranged to be operated by said cams, the latter disposed so as to allow the wave-change switch to be automatically operated according to the abutment means chosen to limit the travel of said movable member, a muting switch, an element secured on said shaft to operate the muting switch, a volume control and mechanical connection between said shaft and volume control to permit the latter to be adjusted according only to the angular movement of the shaft.

5. Apparatus for operating the tuning means of radio and like receivers, comprising a control head, a shaft secured to said head and arranged for axial and angular adjustment, a first mechanical connection from said shaft to the operating member of the tuning means, said mechanical connection permitting axial movement of the shaft only to be effective, an axially movable member associated with said first connection so as to move always in accordance with the axial movement of said shaft, a pre-selector device having abutment means projecting at varying distances therefrom and being arranged for rotary movement on said shaft, a second mechanical connection from said shaft to said pre-selector device, to permit only the angular adjustment of said shaft to be effective on said pre-selector device, the latter being disposed so that the abutment means thereof may be selectively brought to positions where said axially movable member

has its axial movements selectively limited to varying extents by contact with said abutment means.

5 6. Apparatus for operating the tuning means for radio and like receivers, comprising a shaft arranged for axial or angular movement, a control head thereon, a circular rack secured to said shaft, a pinion meshing with said rack and controlling the tuning means, a rack stop-bar mesh-
10 ing also with said pinion, a pre-selector drum disposed for angular movement on said shaft, a clutching device secured upon said shaft and effectively clutching the latter to the pre-selector drum in one position of axial adjustment of the
15 shaft, said drum possessing a plurality of abutment means projecting varying distances therefrom, and adapted selectively to co-operate with said axially slidable stop-bar.

20 7. Apparatus for operating tuning means for radio and like receivers, comprising a shaft arranged for axial or angular movement, a control head thereon, a circular rack secured to said shaft, a pinion meshing with said rack, and controlling the tuning means, a rack stop-bar mesh-

ing also with said pinion, a pre-selector drum disposed for angular movement on said shaft, a clutching device secured upon said shaft and effectively clutching the latter to the pre-selector drum in one position of axial adjustment of the shaft, said drum possessing a plurality of abut- 5 ment means projecting at varying distances therefrom, and adapted selectively to co-operate with said axially slidable stop-bar, cams arranged upon the periphery of said drum, a wave-change switch 10 for actuation by said cams, the latter being disposed according to the disposition of said abutment means to give a correct setting of the tuning means for a particular position of the wave- 15 change switch, a volume control including a main "on-off" switch, a mechanical connection from said shaft to operate the volume control and "on-off" switch only by the rotary movement there- 20 of, a muting switch and an element fixed to said shaft for controlling said muting switch to mute the receiver prior to the actuation of the tuning means thereof.

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