April 21, 1936. T. J. SCOFIELD 2,038,241

SELECTOR CONTROL UNIT

Filed July 19, 1934

FIG. 1.

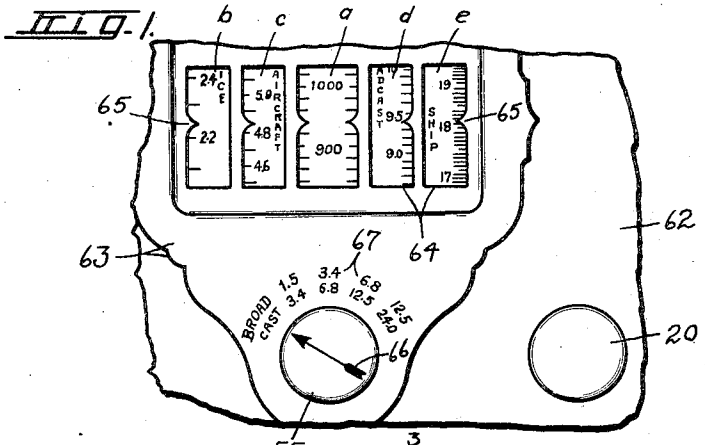


FIG. 2.

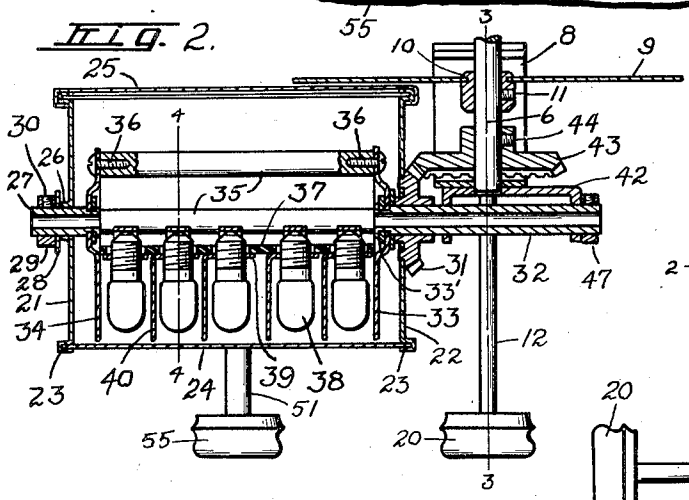


FIG. 3.

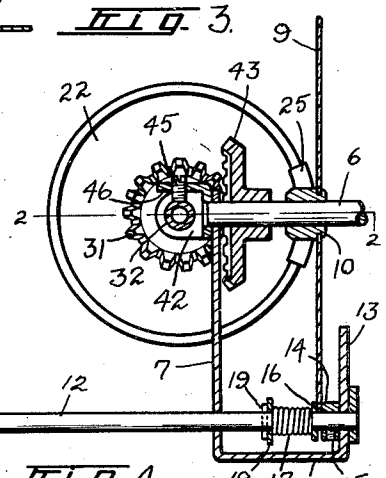


FIG. 5.

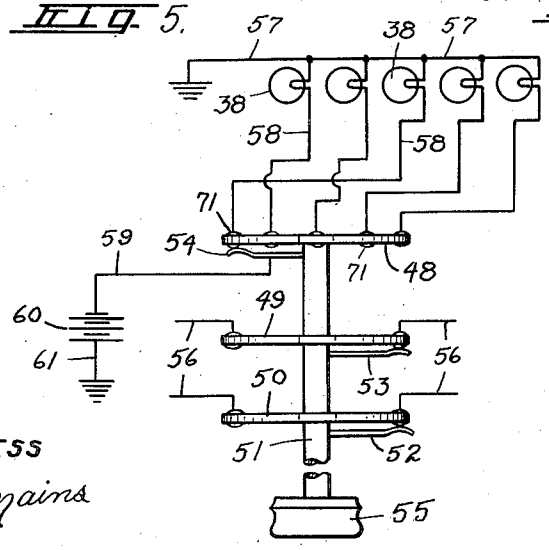
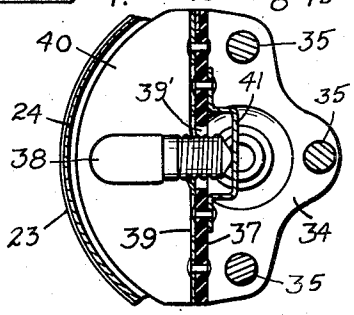


FIG. 4.



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SELECTOR CONTROL UNIT

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Application July 19, 1934, Serial No. 736,104

3 Claims. (Cl. 250—40)

This invention relates to radio receiving apparatus, and particularly, to a multi-band selector control and visual indicating means therefor.

The present tendency in radio communication practice is to extend the frequency range of the signal carrying waves from the broadcast band covering a range of frequencies from 550 to 1,500 kilocycles, into the region known as short waves, which include all frequencies above the upper limit of the so-called broadcast band. In order to provide for the reception of signals in the short wave region, radio receivers have been designed with multi-band selectors so as to be able to receive, in addition to the broadcast band, high frequency bands upwards of 1500 kilocycles. It has been found impractical to cover effectively a range of frequencies materially broader than the broadcast band by means of a selector having a single control, which has led to the universal adoption of an additional control for changing the constants of the selector circuit, thereby shifting the tuning range of the main tuning unit from one band of frequencies to another.

The provision of adequate tuning scales to indicate the selector setting in multi-band receivers has presented a major problem to radio receiving set manufacturers. An attempt has been made to utilize a multi-scale indicator in which all frequency bands are simultaneously made visible to the operator. Indicators of this type are confusing since the operator cannot tell, at a glance, the particular frequency band setting over which the receiver is then being tuned.

The main object of my invention is to provide a selector control for multi-band radio receivers that embodies a visual indicating system for individually designating the several frequency bands over which the receiver is tunable. More specifically, it is an object of this invention to provide in a multi-band radio receiver, a selector control having two variable elements, one for simultaneously actuating the tuning condensers and the tuning scales, and the other for simultaneously selecting the frequency band that is desired to be received and making visible the tuning scale corresponding to the selected frequency band.

Other objects and advantages relate to details of the control mechanism, and to the arrangement of the various parts thereof, all as will more fully appear from the following description taken in connection with the accompanying drawing, in which:—

Figure 1 is a front elevation showing a portion of an escutcheon, the tuning scales and the selector control knobs;

Figure 2 is a horizontal sectional view of the selector control unit taken along line 2—2 of Figure 3;

Figure 3 is a vertical sectional view of the selector control unit taken along line 3—3 of Figure 2;

Figure 4 is a cross sectional view through the dial light assembly taken along line 4—4 of Figure 2; and

Figure 5 schematically illustrates the band selector control and the dial light circuit diagram.

Referring to the drawing, the reference numeral 6 designates one end of a condenser shaft of the main tuning condensers of a conventional radio receiver, the construction of which is well known in the art, and need not be here illustrated or described. The shaft 6 is journaled in extension 7 of U-shaped bracket 8 and is adapted to be rotated by means of driving disk 9 secured to hub 10, which may be releasably secured to the shaft 6 by set screw 11.

A control drive shaft 12 is journaled in the members 7 and 13 of bracket 8 in parallel relation with respect to the condenser shaft 6, and spaced therefrom so as to be adjacent the periphery of the disk 9. A driving connection between the shaft 12 and the disk 9 is provided by friction washers 14 and 16, the former being secured to the shaft by suitable means as set screw 15, and which washers are adapted to engage the peripheral edges on opposed sides of the disk. The washer 16 is yieldingly maintained in contact with the disk 9 by spring 17, one end of which contacts washer 16, and the other end contacts washer 18, which, in turn, presses against a stop pin 19 passing through the shaft 12. Thus, by rotating the shaft 12, condenser shaft 6 will also be rotated, but at a much slower rate, through the frictional driving connection just described. To facilitate the rotation of the control shaft 12, a control knob 20 may be provided at one end thereof, and secured thereto in any conventional manner.

The setting of the main tuning condensers actuated by the condenser shaft 6 may be indicated by an illuminated multi-scale drum dial assembly now to be described. The drum dial consists of two circular end plates 21 and 22 having their peripheral edges turned outwardly and then inwardly to form opposed flanged grooves 23. Tuning scale member 24, of translucent flexible material as celluloid, is adapted to be retained in edgewise engagement on opposite sides by the grooves 23, and preferably extends 320 degrees, more or less, circumferentially in the grooves 23. The scale member 24 may be provided with a plural-

ity of tuning scales placed in parallel columnar arrangement circumferentially on the drum dial. portions of these scales are shown in Figure 1, and have been designated by the letters —*a*—, —*b*—, —*c*—, —*d*— and —*e*—. By way of example, scale —*a*— may cover the broadcast band from 550 to 1500 kilocycles, scale —*b*— a band from 1.5 to 3.4 megacycles, scale —*c*— a band from 3.4 to 6.8 megacycles, scale —*d*— a band from 6.8 to 12.5 megacycles and scale —*e*— a band from12.5 to 24 megacycles.

The end plates **21** and **22** may be held in contact with the scale member **24** by means of a curved plate **25** having its ends crimped over the outer portions of the flanged grooves **23**, and positioned to overlap the adjacent ends of the scale member **24** for preventing the mid sections of these ends from warping, thereby maintaining a cylindrical contour. The end plate **21** is provided with a centrally located bearing **26** adapted to be journaled upon a short tubular stub shaft **27**. The bearing **26** is maintained against outward axial movement by washer **28** and collar **29**, the latter being secured to shaft **27** by a set screw **30**. The end plate **22** has a centrally positioned aperture for receiving the hub of beveled gear **31** which may be secured to the end plate by means of bosses extending from the back side of the gear through the plate, and which may be clinched, as by riveting, in a well known manner.

The bevel gear **31** is rotatably mounted on tubular shaft **32**. One end of the shaft **32** has a portion of reduced diameter adapted to be received by an aperture positioned in a semi-circular end plate **33** of the dial light assembly. A washer **33'** positioned over the reduced end portion of the shaft **32** adjacent the inner side of the end plate **33** assists in securing the shaft **32** to the end plate **33** when the reduced end portion of the shaft is upset, as by riveting.

The end plate **33** supports a similar end plate **34** in spaced relation thereto by means of, in this instance, three spacing rods **35**, which may be secured to the end plates **33** and **34** by screws **36**. The stub shaft **27** is preferably secured to the end plate **34** in axial alinement with the shaft **32** in a manner similar to that employed in securing the shaft **32** to the end plate **33**.

Supported intermediate the end plates **33** and **34** is a plate **37** of insulating material which may be mounted by means of tenons provided along the supporting edges anchored in suitable apertures in the end plates for supporting the dial light sockets.

The dial light sockets, as more clearly shown in Figures 2 and 4, comprise five socket plates **39** secured to the front of plate **37**, as by riveting, and have a spiral-shaped aperture positioned concentrically with respect to apertures **39'** of larger diameter in plate **37**.

Bridging each aperture **39'** and secured to the back side of the plate **37**, as by riveting, is a U-shaped contact strip **41**.

The five dial lamps **38**, one for each scale, are of standard construction having a double contact base in which one contact projects axially from the tip of the base, and the other is connected to the threaded portion in a manner well known in the art. The dial lamps are adapted to be screwed into the socket plates **39** until the central contact is seated on contact strips **41**.

The socket plates **39** may be joined electrically and connected with the end plates **33** and **34**, which, in turn, may be grounded by suitable connections through supporting shaft **32**. The contact strips **41** are connected individually by conducting wires to suitable contacts of a switching element to be hereinafter described.

The socket plates **39** are also provided with semi-circular extensions **40** extending at right angles thereto, which serve as partitions between the respective dial lamps **38**. The partitions **40** have a substantial semi-circular contour conforming with the contour of end plates **33** and **34** and are spaced from each other so as to form, in conjunction with the curved scale member **24**, separate lamp chambers, each chamber being adapted to illuminate one of the tuning scales on the member **24**.

The entire drum dial assembly is supported by the shaft **32** which, in turn, may be journaled in a suitable U-shaped bracket **42**, mounted on bracket member **7** adjacent its upper end. The shaft **32** is so positioned that its axis intersects the axis of shaft **6** at right angles in a horizontal plane.

The condenser shaft **6** may be operably connected with the drum dial by means of beveled gear **43** secured to the shaft **6** by set screw **44**, which gear is adapted to mesh with the beveled gear **31**. Shaft **32**, and consequently, the entire dial light assembly may be maintained against rocking movement by means of a set screw **45** threaded through projection **46** of bracket **42** and bearing upon shaft **32**. A releasably secured collar **47** on the end of shaft **32** may be provided for preventing accidental disengagement of the bevel gears **31** and **43**, while adjustments of the angular position of the dial light assembly are being made.

The frequency band selector may consist of a gang switch, as shown diagrammatically in Figure 5, having a plurality of switch sections indicated at **49** and **50**, and a switch section **48** adapted to control the dial lamps **38**. The selector switch also includes a control shaft **51** upon which may be operatively secured switch contact arms **52**, **53** and **54**, all of which are adapted to be simultaneously actuated by the rotation of shaft **51** made effective by control knob **55** mounted on one end thereof.

The switch sections **49** and **50** are diagrammatically illustrated as having circuit connections **56** electrically connected to the selector circuits of the radio receiver, not shown, for effecting a change in the circuit constants to make the receiver responsive over the several frequency bands.

The switch section **48**, which is devoted to the control of the dial lamps **38**, is schematically shown as having a plurality of contacts **71** connected by wires **58** to the contact strips **41** in the dial light assembly. In practice, the connecting wires **58** may be threaded through the bore of tubular shafts **27** and **32**.

The socket plates **39** of the dial light assembly may all be inter-connected and grounded through wire **57**. Contact arm **54** actuated by control shaft **51** may be electrically connected by wire **59** to a suitable source of potential **60** which is grounded by wire **61**. Thus, as the control shaft **51** is rotated to select the desired frequency band, the contact arm **54** will engage the proper switch contact **71** to complete the electrical circuit and energize the corresponding dial lamp **38** to illuminate the proper frequency scale on the member **24**.

The control assembly may be mounted as a unit in back of a radio panel **62**, as shown in Figure 1, which panel has been provided with properly

spaced apertures for permitting the ends of control shafts 12 and 51 to extend therethrough.

The panel 62 may also be provided with a suitable escutcheon plate 63 having, in this instance, five rectangular apertures 64 through which the tuning scales —a—, —b—, —c—, —d— and —e—, corresponding to the five frequency bands to be received, are made visible. At least one side edge adjacent each aperture 64 is properly provided with a projection or pointer 65 with which the graduations on the respective scales are brought into registration for indicating the station setting.

The control knob for actuating the selector shaft 51 is preferably provided with an arrow 66, or other suitable indicating means adapted to cooperate with indicia 67 on the escutcheon plate 63 for indicating the particular frequency band setting of the selector. As illustrated, the indicia 67 may designate the five frequency bands, corresponding to the bands designated on scales —a—, —b—, —c—, —d— and —e—.

In operation, when the operator wishes to select signals within any of the frequency bands above designated, the control knob 55 is turned until the pointer 66 is adjacent the desired frequency band setting. In this position, the selector switch through the switch sections 49 and 50 will make the selector circuit of the radio receiving set responsive to signals throughout the tuning range of the main tuning condenser as varied by the control shaft 12. The setting of the control knob 55 also completes the dial light circuit so that the frequency scale over which the receiver is now made tunable will be the only scale that is illuminated.

Although I have shown and described a particular selector control unit and a visual indicator therefor, it is to be understood that the same is for illustrative purposes, and that many changes and modifications may be made by those skilled in the art without departing from the spirit and scope of the appended claims.

I claim:

1. In radio apparatus for receiving a plurality of frequency bands and including a variable tuning element, a support member, a rotatable actuating shaft for said tuning element journaled in said member, a control shaft journaled in said member, means for connecting said control shaft to said actuating shaft in speed reducing driving relation, a dial supporting shaft carried by said support at right angles to said actuating shaft, a drum dial rotatably journaled upon said dial supporting shaft, means connecting said dial in positive driving relation with said actuating shaft, said dial having a plurality of scales corresponding to the several frequency bands over which said receiver is tunable, and means within said dial carried by said dial supporting shaft for separately illuminating said scales.

2. In radio apparatus for receiving a plurality of frequency bands including a continuously variable tuning element and a cooperating tuning element variable in steps, a support member, a rotatable actuating shaft for said continuously variable tuning element journaled in said member, a control shaft journaled in said member, means for connecting said control shaft to said actuating shaft in speed reducing driving relation, a dial supporting shaft carried by said support at right angles to said actuating shaft, a drum dial rotatably journaled on said dial supporting shaft, means connecting said dial in positive driving relation with said actuating shaft, said dial having a plurality of scales corresponding to the several frequency bands over which said receiver is tunable, a separate illuminating means within said dial for each of said scales, an actuating shaft for adjusting said second tuning element to selectively render said first tuning element responsive over a given frequency band, and means actuated by said last named shaft for controlling the illuminating means in accordance with the frequency band to which said receiver is adjusted.

3. In radio apparatus for receiving a plurality of frequency bands including a continuously variable tuning element and a cooperating tuning element variable in steps, a support member, a rotatable actuating shaft for said continuously variable tuning element journaled in said member, a control shaft journaled in said member, means for connecting said control shaft to said actuating shaft in speed reducing driving relation, a dial supporting shaft carried by said support at right angles to said actuating shaft, a drum dial rotatably journaled on said dial supporting shaft, means connecting said dial in positive driving relation with said actuating shaft, said dial having a plurality of scales corresponding to the several frequency bands over which said receiver is tunable, means interiorly of said dial carried by said dial supporting shaft for illuminating said scales comprising a lamp compartment in registration with each scale and a dial lamp in each compartment, an actuating shaft for adjusting said second tuning element to selectively render said first tuning element responsive over a given frequency band and a switch actuated by said last named shaft for selectively closing the energizing circuits of the dial lamps to illuminate the tuning scale corresponding to the frequency band to which said second tuning element is adjusted.

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