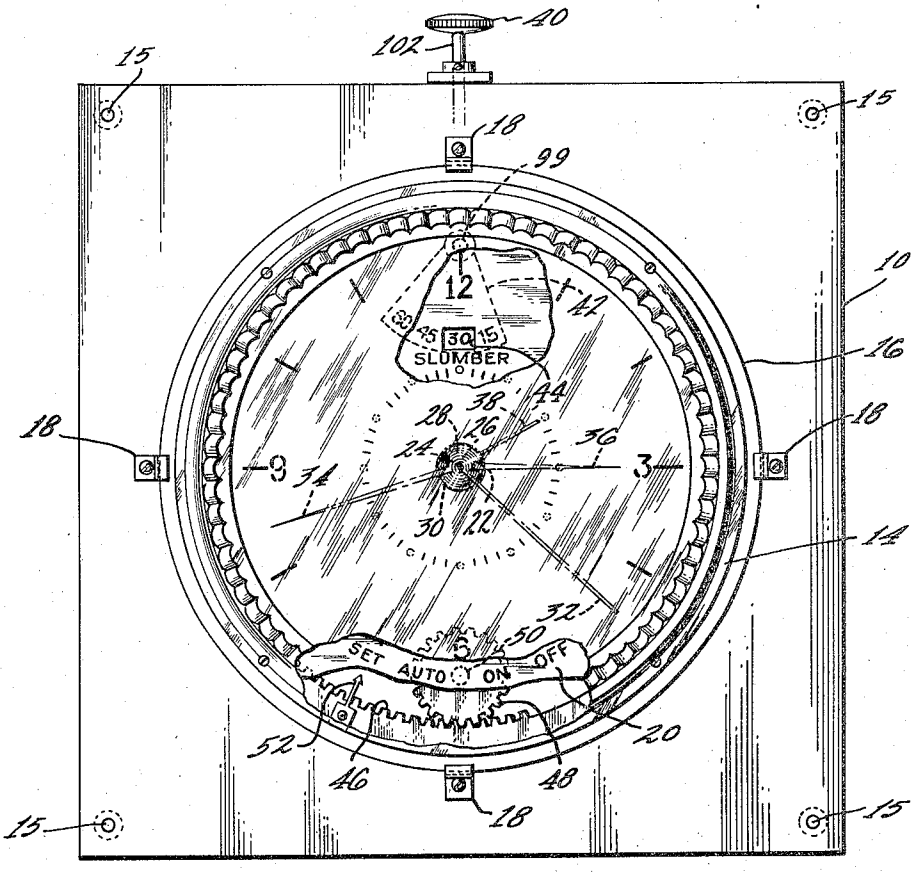
March 3, 1959 C. E. MILLER 2,876,344

AUTOMATICALLY CONTROLLED SIGNAL RECEIVERS

Filed Nov. 17, 1954 5 Sheets-Sheet 1

Fig. 1.



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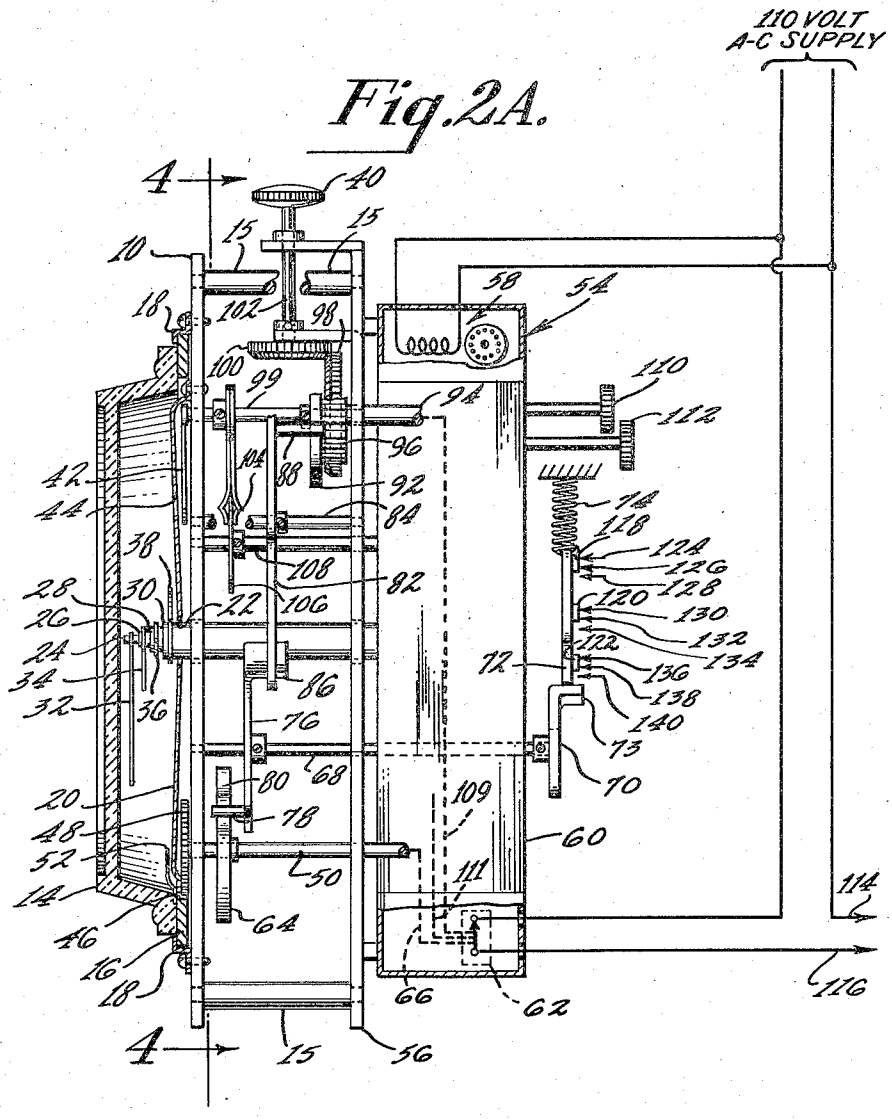
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AUTOMATICALLY CONTROLLED SIGNAL RECEIVERS

Filed Nov. 17, 1954 5 Sheets-Sheet 2

Fig. 2A.



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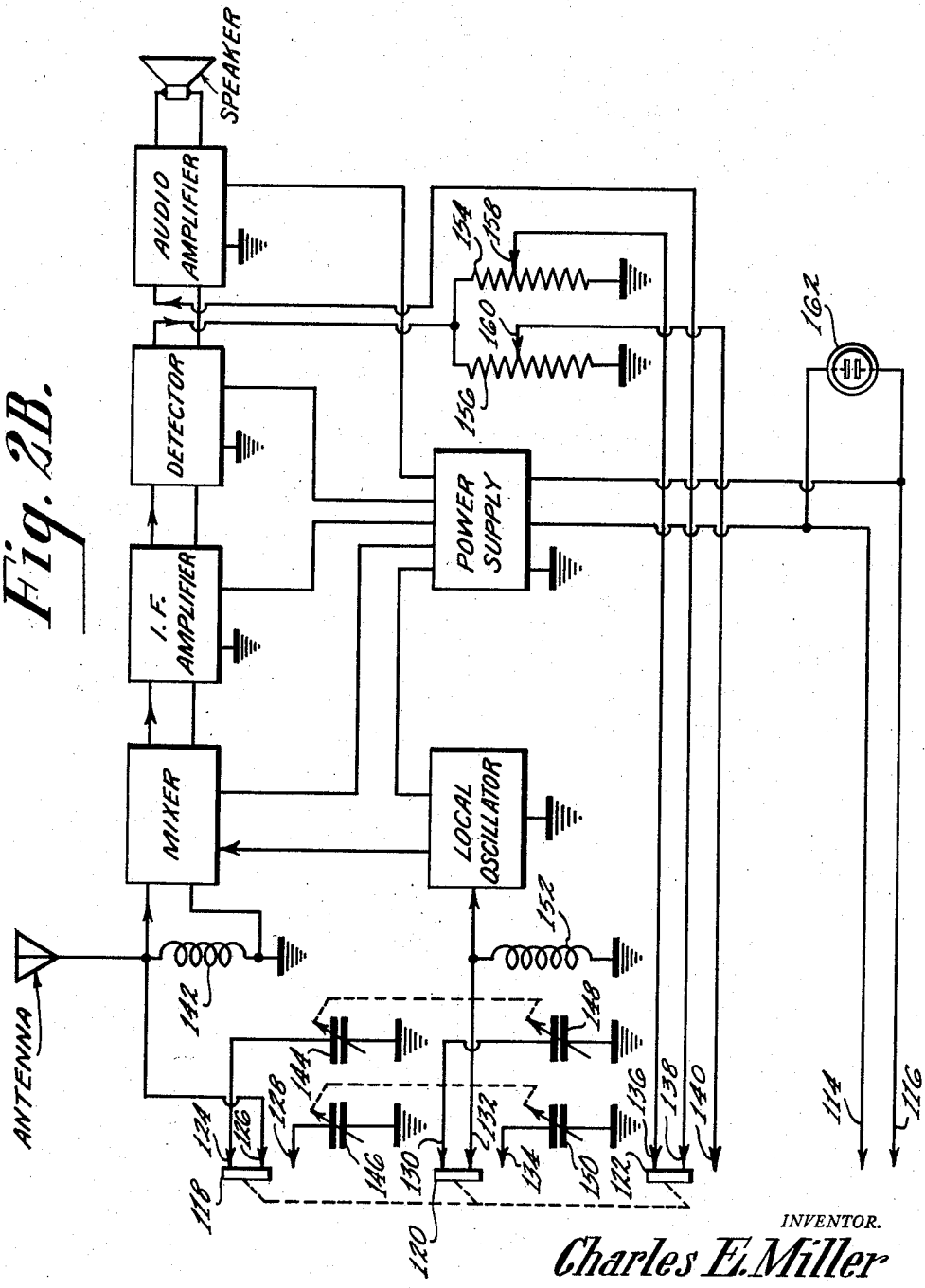
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AUTOMATICALLY CONTROLLED SIGNAL RECEIVERS

Filed Nov. 17, 1954 5 Sheets-Sheet 3

Fig. 2B.



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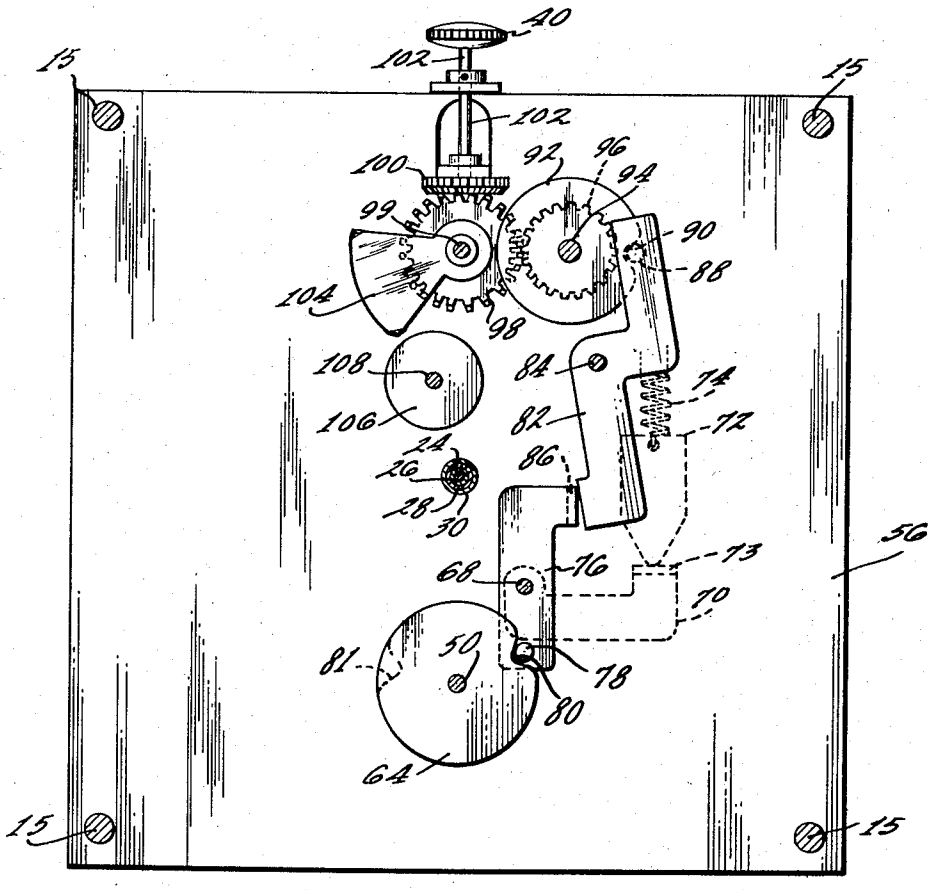
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AUTOMATICALLY CONTROLLED SIGNAL RECEIVERS

Filed Nov. 17, 1954 5 Sheets-Sheet 4

Fig. 3.



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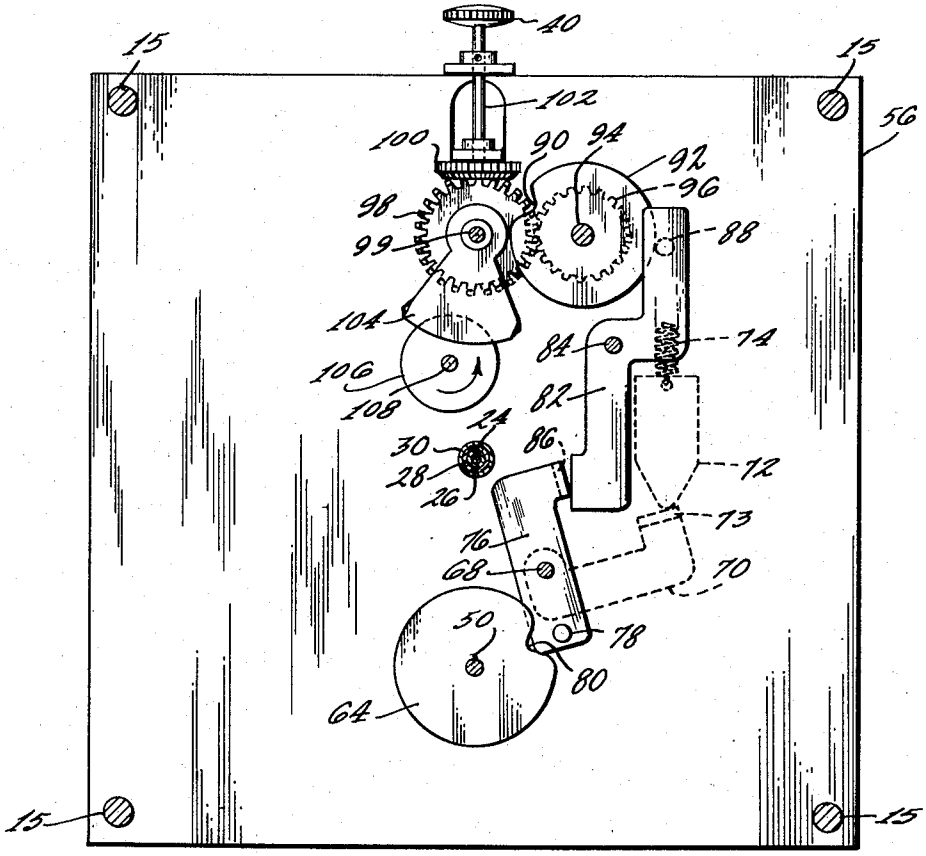
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AUTOMATICALLY CONTROLLED SIGNAL RECEIVERS

Filed Nov. 17, 1954 5 Sheets-Sheet 5

Fig. 4.



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United States Patent Office 2,876,344
Patented Mar. 3, 1959

2,876,344

AUTOMATICALLY CONTROLLED SIGNAL RECEIVERS

Charles E. Miller, Cambridge, Ohio, assignor to Radio Corporation of America, a corporation of Delaware

Application November 17, 1954, Serial No. 469,458

4 Claims. (Cl. 250—20)

This invention relates to automatically controlled signal receivers, and more particularly to radio receivers and the like which are adapted to be turned on and off at predetermined times by clock operated means. Such receivers have come to be known commercially as clock radios or radio receivers.

In clock radio receivers, a switch is arranged to turn the receiver on at a time determined by an alarm setting of the clock. In addition, a manually operated off-on switch is generally provided. A third type of control means found on certain clock radio receivers is a "slumber" control that is used to turn on the receiver and automatically to turn it off after a selected length of time has expired and the listener has gone to sleep. This control is designed to be used without affecting the automatic alarm setting.

The combination of the "slumber" control with the automatic radio alarm feature has given rise to two main problems. First, the user may desire to listen to one station at night when the mechanism providing the control functions referred to is in the "slumber" position, but to another station when the receiver is automatically turned on the next morning; and second, the user may desire to use different volume levels for the "slumber" and automatic alarm operations.

Accordingly, it is one of the objects of the present invention to provide an improved clock controlled radio receiver, which may be preset to be automatically turned on at a preselected time and to a preselected station as an awakening alarm for example, and yet at any time, as at bedtime, it may independently be turned on and operated to receive a different station for a selectable length of time, at the expiration of which time the receiver is automatically turned off until said preset time.

It is another object of the invention to provide an improved clock-radio receiver providing a preset automatic awakening alarm on a preselected station at a preselected sound volume level, and also providing for listening to a second station at a second volume level for a preselected length of time after such alarm setting is made and with automatic turn-off after the selected length of time has expired.

It is yet another object of the invention to provide an improved control system for a clock radio receiver wherein a first station may be selected for automatic alarm action when a "preset" control is actuated or adjusted, and a second station may independently be selected for reception when a "slumber" control is actuated or adjusted.

These and further objects and advantages of the present invention are achieved, in general, by providing a radio receiver that has two separate and independent sets of tuning and volume control means and also a function selector control element which may be moved to different positions to adjust the receiver for different modes of operation as referred to. In one embodiment it may have four positions. In the first or "off" position, a power switch which supplies operating current to the radio receiver is held in the open position. In the second or "on" position, the power switch is held in the closed position and causes the receiver to be energized.

In the third or alarm position, called the "auto" position, a clock mechanism automatically closes the power switch for energizing the receiver at a time selected by the user, as for the awakening alarm hereinbefore mentioned. In this position, a first or main set of volume and tuning control means, which may have operating controls located on the front panel of the receiver, are electrically connected to the receiver circuits. In the fourth or preset position of the function selector control, called the "set" position, the clock mechanism again automatically closes power switch means at a time selected by the user.

However, in this last position, a second or auxiliary set of tuning and volume control means, the operating controls for which may be located on the back panel of the receiver, are electrically connected to the receiver circuits and are effective to select stations and adjust the volume level, while the first set of tuning and volume control means are disconnected.

A "slumber" control means is also provided that, when operated, turns on the receiver to any station and at a volume level that has been selected by the first set of controls, for a selected period of time and also disengaging the second set of tuning and volume control means if the function selector control is in the fourth or "set" position. The receiver after operating for the selected length of time is then automatically turned off and at the same time the second set of controls are reengaged if the function selector control is in the "set" position.

However, the invention, both as to its organization and operation, will best be understood from the following description when read in connection with the accompanying drawings, and its scope is defined by the appended claims.

In the drawings:

Figure 1 is a front elevation view, partially broken away, showing the selector controls of a control mechanism for a clock radio receiver in accordance with the invention;

Figure 2A is a side elevation view, partially in section and partially broken away, of the control mechanism shown in Figure 1 together with a portion of a schematic circuit diagram of the electrical control connections therefor;

Figure 2B is a further portion of the schematic circuit diagram of Figure 2A showing the remainder of the electrical connections for the control mechanism of Figures 1 and 2A and the controlled radio receiver, in accordance with the invention, and

Figures 3 and 4 are sectional front views of the clock timer control mechanism shown in Figure 2 taken through line 4—4 to show certain of the parts thereof under different operating conditions in accordance with the invention.

Referring now to the drawings wherein like elements are designated by like reference numerals throughout the figures, and referring particularly to Figure 1, the radio receiver control means includes a control mechanism or assembly having a front mounting plate **10** on which the indicating and most of the manually operated panel elements, including the clock timer, are mounted. A rotary bezel or function selector control element **14** of suitable material, such as transparent plastic, is mounted on the face of the front mounting plate **10**. Rotation of the bezel or ring **14** from one angular position to another, as will be more fully explained hereinafter, over a limited arc, provides for setting the mechanism and the receiver for the various desired functions hereinbefore described.

An annular mounting ring **16** is fixedly connected to the base of and moves with the bezel **14**, and the combined assembly is held in position for rotation on the face of the front mounting plate **10** by positioning lugs **18**, which are fastened to the front plate **10** to fit over and loosely hold the mounting ring **16**.

A clock face **20** for an internal clock, hereinafter referred to, is mounted in spaced relation between the front mounting plate **10** and the inner face of the bezel **14**. A circular aperture **22** in the clock face **20** allows concentric shafts **24**, **26**, **28**, and **30** to project through into the space between the clock face **20** and the inner face of the bezel **14**. The hands of the clock are mounted on these shafts—a sweep second hand **32** being mounted on the first or inner shaft **24**; a minute hand **34** on the second shaft **26**; and hour hand **36** on the third shaft **28**; and an alarm set hand **38** on the fourth or outer shaft **30**.

A "slumber" control knob **40** located at the top of the assembly is connected to turn the associated radio receiver on for a selected period of time after which it will automatically turn off, and the amount of time selected for the receiver to remain on in response to this action is determined by how far the knob **40** is rotated, as will be more fully explained hereinafter.

The indicator plate **42** which moves in response to rotation of the knob **40**, and is marked to indicate the amount of time selected for the radio receiver to remain on, is positioned between the clock face **20** and the mounting plate **10**. A portion of the movable plate **42** is visible through a rectangular aperture **44** in the clock face **20** and the indicia, such as numbers on the plate are visible through the aperture and indicate, preferably in minutes, the amount of time selected.

Gear teeth are cut or otherwise formed for a portion of the inner circumference of the mounting ring **16** to provide a segment of a ring gear **46**. As the bezel or function selector control **14** is rotated to different angular positions, the ring gear **46** rotates a spur gear **48** which is meshed therewith. The spur gear **48** is mounted on a control shaft **50** which is connected to actuate a power switch **62** (shown in Figure 2A) of the clock timer control assembly. The particular position of the function selector control **14** that has been selected is indicated by the position of a pointer **52** (fastened to and movable with the function selector control **14**) with respect to the previously referred to legends "Set," "Auto," "On," and "Off," on the clock face **20**.

The function selector control **14** and the "slumber" control knob **40** control the operation of a radio receiver that has two sets of tuning and volume controls conditioned to be selectively connected to it. The operation of the mechanism in each of the four positions of the function selector control **14** will be fully explained hereinafter but it may be summarized as follows:

(1) In the "off" position the power switch **62** (Figure 2A) is open, and no power is supplied to the radio receiver,

(2) In the "on" position, the power switch **62** is mechanically closed and a first or main set of tuning and volume controls are connected to the receiver. The receiver then operates with a station and a volume level selected by these controls, independently of the clock timer mechanism,

(3) In the "auto" position, the power switch **62** is automatically closed by the clock mechanism **60** (shown in Figure 2A) at a predetermined time selected by the user, and the receiver operates on the station selected by the first or main set of tuning and volume controls, and

(4) In the "set" position, the switch **62** is again closed automatically at a predetermined time selected by the user, but in this instance the receiver will operate on a station and with a volume level selected by the second or auxiliary set of tuning and volume controls.

The operation of the mechanism when actuated by the "slumber" control knob **40** may be summarized as follows:

(1) Rotation of the "slumber" control knob **40** rotates a slumber actuating shaft **94** (shown in Figure 2A) mechanically closing the power switch **62** and holding it closed until the shaft **94** is returned to its initial position,

(2) The degree of rotation of the "slumber" control knob **40** will determine how long the slumber actuating shaft **94** will remain held in the rotated position and, hence, how long the power switch **62** will be held closed, by determining how far a clutch mechanism **104** is moved onto a drive wheel **106** (as shown in Figures 3 and 4),

(3) The mechanism disconnects the second or auxiliary set of tuning and volume controls from the receiver and connects to the receiver the first or main set of tuning and volume controls, if the function selector control **14** is in such a position to connect the second or auxiliary set of tuning and volume controls to the receiver. If the mechanism is in a position that the first set of volume and tuning controls are already connected to the radio receiver it merely remains in this position, and

(4) After the "slumber" control knob **40** has been turned back to its initial position by action of the clutch mechanism **104** and the drive wheel **106**, the mechanism will open the power switch **62** and, if the function selector control **14** is in the "set" position, disconnect the first set of tuning and volume controls from the receiver and reconnect the second set to the receiver.

Referring now to Figures 2A, 3 and 4, a clock timer mechanism **54** is mounted on a rear mounting plate **56** which is held in parallel spaced relation to the front mounting plate **10** by four spacer pins **15** (Figure 1). The clock timer mechanism **54** has three sections: a clock motor **58**, a clock mechanism **60** driven by the motor, and a power switch **62**.

The control shaft **50** is fixed rigidly to the first spur gear **48** (shown in Figure 2A), and carries the position selector cam **64** behind the front plate **10**. As is indicated by a dotted line **66**, the power switch **62** can be controlled by rotation of the selector shaft **50**. An actuating shaft **68** extends from the front plate **10** through the rear plate **56** and the clock mechanism **60** to the rear of the unit. Fastened rigidly to the end of the actuating shaft **68** is an actuating lever **70**. An insulated switch plate **72** is urged against a flange **73** of the actuating lever **70** by a spring **74**. Also fastened to the actuating shaft **68** between the mounting plates **10** and **56** is a second lever **76** which carries on its lower end a first pin **78** adapted to fall into a first depression **80** in the selector cam **64** when the cam **64** is rotated to the proper position as shown in Figures 3 and 4.

A third lever **82** is held between the mounting plates **10** and **56** on a third shaft **84**, and its lower end is in contact with the right angle flange **86** on the second lever **76**. The upper end of the third lever **82** carries a second pin **88** which is designed to fall into a second depression **90** (see Figures 3 and 4) on a second cam **92** which is carried on a "slumber" actuating shaft **94**, which shaft extends into the clock mechanism **60**. Also carried on the "slumber" actuating shaft **94** is a second spur gear **96** which is meshed with a first bevel gear **98** carried on an indicating shaft **99**, and which, in turn, is meshed with a second bevel gear **100**. The second bevel gear **100** is connected by a sixth shaft **102** to the "slumber" control knob **40**. The indicator plate **42** is carried on that portion of the indicating shaft **99** projecting through the front mounting plate **10**.

Also mounted on the indicating shaft **99** is a clutch mechanism **104** which is adapted to operatively contact a drive wheel **106** which is carried on a drive shaft **108** that is continuously rotated by the clock mechanism **60**. The clutch mechanism **104** is adapted to be selectively placed in contact with and driven by the drive wheel **106** when the "slumber" knob **40** is rotated to hold this knob in the rotated position. The particular point that the

clutch **104** is initially placed against the drive wheel **106** when the "slumber" control knob **40** is rotated will determine the length of time that a radio receiver will be operated in the "slumber" position, as will be more fully explained when the operation of the mechanism is described.

Time set and alarm set thumb wheels, **110** and **112**, respectively, project through the rear of the clock mechanism **60** and operate in the usual and conventional manner.

A 110 volt A. C. supply is connected directly to the clock motor **58** and through a power switch **62** to the leads **114** and **116**, which are connected to a radio receiver power supply (see Figures 2A and 2B). The power switch **62** can be operated in any of three ways, that is, by rotation of the control shaft **50** by turning the function selector control **14** (as indicated by the dotted line **66**), or by rotation of the "slumber" actuating shaft **94** by turning the "slumber" control knob **40** (as indicated by the dotted line **109**), or automatically by the clock mechanism **60** (as indicated by the dotted line **111**).

As was mentioned before, it is necessary to automatically switch from one set of tuning and volume controls to a second set of tuning and volume controls for the radio receiver when the control assembly is performing certain of its functions. This switching of tuning and volume control is accomplished by a switch plate **72** and its associated contacts. The switch plate **72** has two positions: an "up" position (as shown in Figures 2A and 4) which will connect a first set of tuning and volume controls to the radio receiver, and a "down" position (as shown in Figure 3) which will connect a second set of tuning and volume controls to the radio receiver.

To accomplish the above mentioned switching the switch plate **72** carries on its rear face three single-pole double-throw switches to switch the tuning and volume controls. Three movable shorting bars **118**, **120**, and **122** form single-throw, double-pole selector switches with the three contacts associated with each shorting bar, as indicated schematically in the drawing. The upper shorting bar **118** has three contacts **124**, **126**, and **128** associated with it; the middle shorting bar **120** has three contacts **130**, **132**, and **134** associated with it; and the lower shorting bar **122** also has three contacts **136**, **138** and **140** associated with it.

In the "up" position of the switch plate **72**, as shown in Figure 2, the shorting bars **118**, **120** and **122** connect together the upper pair of each triplet of contacts, that is, contacts **124–126**, **130–132** and **136–138**. In the "down" position, of course, the shorting bars **118**, **120** and **122** will connect together the lower pair of each triplet, that is, contacts **126–128**, **132–134**, and **138–140**.

Referring now particularly to Figure 2B, a superheterodyne radio receiver, shown in block diagram, includes the ordinary units, that is, antenna, mixer and local oscillator, I. F. amplifier, detector, audio amplifier, speaker, and power supply. A signal input inductor **142** is connected between the mixer and ground, and the R.-F. high potential side of the inductor **142** is connected to the center contact **126** of the upper triplet of contacts controlled by the shorting bar **118**. As has been stated before, in the "up" position of the switch plate **72** a first set of tuning and volume controls is connected to the receiver and in the "down" position of the switch plate **72** a second set of tuning and volume controls is connected to the receiver.

As can be seen, a first and a second, or main and auxiliary, tuning condensers, **144** and **146**, are connected respectively to the outer two contacts **124** and **128** of the triplet. It is readily apparent that if the shorting bar **118** is in the "up" position that contacts **124** and **126** are connected together connecting the first condenser **144** in parallel with the inductor **142**; and if the shorting bar is in the "down" position that the lower two contacts **126** and **128** are connected together connecting the second condenser **146** in parallel with the inductor **142**.

Similarly, a first and a second, or main and auxiliary, oscillator condenser, **148** and **150**, are connected to the outer contacts **130** and **134** associated with the middle shorting bar **120**, and the center contact **132** is connected to the local oscillator. A frequency determining inductor **152** is connected between the local oscillator and ground. With the middle shorting bar **120** in the "up" position the first oscillator condenser **148** is shunted across the inductor **152**, and with the shorting bar **140** in the "down" position the second oscillator condenser **150** will be shunted across the inductor **152**.

A first and second or main and auxiliary, volume control potentiometers, **154** and **156**, are connected in parallel across the output of the detector. First and second variable taps **158** and **160** of the volume control potentiometers **154** and **156** are connected to the outer contacts **136** and **140** of the triplet associated with shorting bar **122**. The center contact **138** is connected with the audio amplifier. With the lower shorting bar **122** in the "up" position contacts **136** and **138** are connected together connecting the variable tap **158** of the first volume control **154** to the audio amplifier, and in the "down" position variable tap **160** of the second volume control **156** is connected to the audio amplifier.

In operation, with a 110 volt A. C. supply connected to the clock timer control assembly, the clock mechanism continuously drives the concentric shafts **24**, **26**, and **28** carrying the various hands of the clock to indicate the time.

With the function selector control **14** rotated to its furtherest counterclockwise position as viewed in Figure 1, the control assembly will be in the "off" position and the power switch **62** will be mechanically opened. This will be so indicated by the pointer **52** being adjacent the "off" legend on the clock face **20**.

Only the function selector control **14**, ring gear **46**, the selector spur gear **48**, the control shaft **50**, the position selector cam **64**, the levers **76** and **70**, and the actuating shaft **68**, are concerned with the selection of the manually "on" and automatically "on" functions, and their operation will be described without reference to the remainder of the mechanism at this time.

With the pointer **52** in the "off" position the selector cam **64** will be rotated by the ring gear **46** and the spur gear **48** in a counterclockwise direction from that position shown in the Figure 3 until the depression **80** will be at the position indicated by the dotted line depression **81**. In the "on" position the depression will be rotated clockwise a third of the way toward the solid line position; in the "auto" position the depression will be rotated two-thirds of the way from the dotted position toward the solid position; and the solid position is the position of the position selector cam **64** when the pointer **52** indicates "set."

As will be best seen by reference to Figures 2A, 3, and 4, the switch plate **72** is being constantly urged downwardly by the compression spring **74**. This tends to force the right end of lever **70** downward, tending to rotate shaft **68** in a clockwise direction, which then urges the lower end of lever **76** to the left to keep the pin **78** in contact with the surface of the cam **64**. As can be readily seen in the "off," "on," and "auto" positions the switch plate **72** will then be in a "up" position as is shown in Figures 2A and 4, but when the depression **80** is opposite the pin **78**, the pin **78** will be forced into the depression **80**, and the right end of the lever **70** can then be forced into a downward position at the urging of the spring **70** allowing the switch plate **72** to assume a "down" position (as shown in Figure 3).

As was stated before, in the "up" position of the switch plate **72** the shorting bars **118**, **120**, and **122** will be in the "up" position, allowing the first set of tuning and volume controls (condenser **144**, oscillator condenser **148**,

and potentiometer 154) to be connected to the radio receiver of Figure 2A. In the "down" position the second set of tuning and volume controls (condenser 146, oscillator condenser 150, and potentiometer 156) are connected to the receiver. It is readily apparent that in all positions of the function selector control 14, except the "set" position, that the first set of tuning and volume controls are always connected to the radio receiver, and that in the "set" position the second set of tuning and volume controls may be connected to the radio receiver.

When the function selector control 14 is rotated to the "on" position the power switch 62 will be mechanically closed as indicated schematically by the dotted line 66. With the power switch 62 closed, power will be supplied to energize the radio receiver. Since the first set of tuning controls are connected to the receiver in the "on" position, as before explained, this set of tuning and volume control will select the station and volume that is reproduced by the receiver. In the "on" position the operation of the receiver is independent of the clock timer mechanism 54.

When the function selector control 14 is rotated to the "auto" position the power switch 62 will be closed automatically at a future preset time by the clock mechanism. The time of automatic closure of the power switch 62 is selected by rotation of the alarm set thumb wheel 112 on the rear of the mechanism, and this time is indicated by the position of the alarm set hand 38 on the clock face 20. Automatic closure of the power switch 62 by the clock mechanism 60 is indicated schematically by the dotted line 111. When the power switch 62 is closed automatically by the clock mechanism, power will then be supplied to the radio receiver and it will operate to a station and volume selected by the first set of tuning and volume controls, for, as explained before, with the control assembly in the "auto" position the first set of tuning and volume controls is connected to the radio receiver.

When the function selector control 14 is rotated to the "set" position the clock mechanism, as before, will automatically close the power switch 62 at a preset time selected by the user. The automatic closure of the power switch 62 in the "set" position is identical with that in the "auto" position. But in the "set" position, as noted before, the switch plate 72 will be in the "down" position and the second set of volume and tuning controls will be connected to the receiver. Hence, when the function selector control 14 is in "set" position, the radio receiver will be automatically turned on to a station and volume selected by the second set of tuning and volume controls.

The "slumber" operation of the control assembly is initiated independently of the position of the automatic positions of the function selector control 14 by rotating the "slumber" control knob 40 in a counterclockwise direction (viewing the knob from above) which rotates the shaft 102 and the second bevel gear 100 in the same direction. The first bevel gear 98 is meshed with the second bevel gear 100 and is also rotated in a counterclockwise direction (when viewed from the front as in Figures 3 and 4). The second spur gear 96 is meshed with the first bevel gear 98 and is rotated in a clockwise direction, which rotates the slumber actuating shaft 94 in a clockwise direction. When the slumber actuating shaft 94 is rotated in a clockwise direction it mechanically closes switch 62 as indicated schematically by the dotted line 109. The slumber actuating shaft 94 will hold the power switch 62 closed as long as it is in the rotated position, but when the slumber actuating shaft 94 is returned to its original position the power switch 62 will no longer be held closed.

When the "slumber" control knob 40 is in its initial or "off" position the clutch mechanism 104 will be in the position indicated in Figure 3, not in contact with the drive wheel 106. The drive wheel 106 is continuously rotated by the clock mechanism 60 in a counterclockwise direction at a relatively slow speed. The clutch mechanism 106 is made up of two metal leaves roughly in the shape of a sector of a circle fastened together along their shortest sides as shown. The two halves of the clutch mechanism 104 spring together but are forced to part as they divide over the drive wheel 106 and are held in this position by their own friction against the drive wheel 106. As the drive wheel 106 rotates slowly in a counterclockwise direction the top of the wheel in contact with the clutch mechanism 104 rotates to the left carrying with it the clutch mechanism 104.

As long as the clutch mechanism is held in a rotated position the shaft 99 will be held in a rotated position holding the first bevel gear 98 in a rotated position which in turn will hold the second spur gear 96 and the slumber actuating shaft 94 in a rotated position thus keeping the power switch 62 closed.

The amount of time that the "slumber" control knob 40 will keep the power switch 62 closed is determined by how far the mechanism is rotated onto the drive wheel 106. It is apparent that the farther the clutch mechanism 104 is rotated onto the drive wheel 106 the longer time it will take for the drive wheel 106 to turn the clutch mechanism 104 back to the off position shown in Figure 3.

The second cam 92 is also fastened rigidly to the slumber actuating shaft 94. With the "slumber" control knob 40 in its initial position as in Figure 3, the second depression 90 in the second cam 92 will be opposite the second pin 88 so that no force will be exerted to the right on the pin 88. However, if the "slumber" control knob 40 is rotated, the cam 92 will be rotated, as explained before, and the depression 90 in the cam surface will no longer be opposite the pin 88, and this pin 88 will be forced to the right by the cam surface, as shown in Figure 4. This will force the lower end of the third lever 82 to the left and against the right angle flange 86 on the second lever 76, and this, in turn, will force the upper end of the second lever 76 to the left rotating the actuating lever 70 counterclockwise, forcing the switch plate 72 into its "up" position thus connecting the first set of tuning and volume contacts to the radio receiver.

It will be seen that if the function selector control 14 is in the "set" position, normally positioning the switch plate 72 in the "down" position and connecting the second set of tuning and volume controls to the radio receiver, that rotation of the slumber control knob will force the switch plate 72 into its "up" position connecting the first set of tuning and volume controls to the radio receiver.

Of course, if the function selector control 14 is in the "off," "on" or "auto" positions the switch plate 72 will already be in its "up" position and rotation of the slumber knob will not move the switch plate 72 but will continue the first set of tuning and volume controls connected to the radio receiver.

After the amount of time selected by the "slumber" control knob 40 has expired, the clutch 104 will have been turned off of the drive wheel 106 allowing the cam 92 to return to its original position and the depression 90 in the second cam 92 will again be opposite the second pin 88. The top of the third lever 82 can then move to the left, allowing its lower end to move to the right. This action allows the second lever 76, and the actuating lever 70 to rotate clockwise (if the function selector control 14 is in the "set" position) so that the first pin 78 can be urged into the first depression 80 in the selector cam 64 by the spring 74, and, finally, this last action will allow the switch plate 72 to go into the "down" position and reconnect the second set of tuning and volume controls to the radio receiver.

The indicator plate 42 is also fastened rigidly to the indicator shaft 99 and rotates with the clutch mechanism 104. A portion of the indicator plate 42 is visible through the rectangular aperture 44 in the clock face 20, and numbers can be placed on the indicator plate 42 to be viewed through the aperture 44 to indicate in minutes

or some other suitable units of time the amount of time that has been selected by the "slumber" control knob **40** for the radio to remain in operation.

The power switch **62** can also be used to control the application of voltage to a common household receptacle **162** which may be connected directly across the voltage input leads **114** and **116** to the receiver power supply, and this receptacle **162** may be located on the radio receiver chassis.

The entire mechanism is designed and shown here to be operated by rotation of the function selector control **14**. The mechanical functions, of course, could be designed to operate on a linear rather than a rotary motion, so that the functions of the function selector control **14** could easily be performed by a push button type of mechanism.

It is possible to use, as may be desired as a further modification of the invention, only one unswitched set of tuning controls with two volume control potentiometers, or to use one unswitched volume control and two sets of tuning controls.

A clock timer control assembly to control the operation of a radio receiver has been provided that will allow a first station and volume level to be used as an alarm to turn on automatically at a predetermined time; and that will also allow a second station and volume level to be turned on manually by the user after the mechanism has been set for an alarm for a selected length of time after which time it will automatically turn off.

What is claimed is:

1. In a clock controlled radio receiver the combination comprising, radio receiver means having a main and an auxiliary set of tuning and volume controls, a power switch operative to connect a source of operating current to said radio receiver, a function selector control having manually selectable off, on, and first and second automatic on positions, said control in the on position operative to close said power switch and in said automatic on positions operative to close said power switch at a predetermined time, a tuning selector switch having two positions, means operative to connect said main set of tuning and volume controls to said radio receiver in a first position of said tuning selector switch and to connect said auxiliary set of tuning and volume controls to said radio receiver in a second position of said switch, means connected with said function selector control operative to position said tuning selector switch in said first position when said function selector control is in said off, on, and first automatic on positions and to move said tuning selector switch to said second position when said function selector control is in said second automatic on position, a second manually operated means operative to close said power switch for a predetermined length of time, further means responsive to said manually operated means only when said function selector control is in said second automatic on position to move said tuning selector switch from said second position to said first position, and means responsive to the automatic opening of said power switch operable only when said function selector control is in said second automatic on position operative to reconnect said tuning selector switch from said first position to said second position.

2. A clock controlled radio receiver comprising, radio receiver means having a first and a second set of tuning and volume controls, a power switch for connecting a source of operating current to said radio receiver, a function selector control having manually selectable off, on, and first and second automatic on positions, said automatic on positions operative to close said power switch at a predetermined time, a tuning selector switch for connecting either of said sets of tuning and volume controls to said radio receiver, means actuated by said function selector control operative to position said tuning selector switch to connect said first set of tuning and volume controls to said radio receiver when said function selector control is in said off, on, and first automatic on positions and to connect said second set of tuning and volume controls to said radio receiver when said function selector control is in said second automatic on position, a second means for closing said power switch, means responsive to said second means for maintaining said power switch closed for a selected length of time, further means responsive to said second means only when said function selector control is in said second automatic on position operative to move said tuning selector switch to disconnect said second set of tuning and volume controls from said radio receiver and to operably connect said first set of tuning and volume controls to said radio receiver, and means responsive to the automatic opening of said power switch operable only when said function selector control is in said second automatic on position to move said tuning selector switch to disconnect said first set of tuning and volume controls from said receiver and to connect said second set of tuning and volume controls to said receiver.

3. In a clock controlled radio receiver the combination comprising, radio receiver means adapted to be energized from a source of operating current, a tuning circuit and a volume control circuit for said receiver means, two sets of receiver tuning and volume control devices, a selector switch having contacts connected with said tuning and volume control circuits and with said tuning and volume control devices, said switch having an operating element movable to connect either of said sets of devices selectively to said circuits, a unitary control mechanism for said receiver having a movable switch actuating member operatively engaging said switch element, said control mechanism comprising means for positioning said actuating member to operate said switch to connect one of said sets of devices with said circuits, a power switch operative to connect a source of operating current to said receiver means, clock timing means connected with and operative to close said power switch at a preselected time, means independent of said clock means operative to close said power switch and to position said actuating member to operate said switch to disconnect said first named set of devices from said circuits and to connect the other set of devices to said circuits, means including a friction clutch operative to adjust and maintain said last named means in operation for a selectable length of time, and means operative to open said power switch and to reposition said actuating member to operate said switch to disconnect said last named set of devices from said circuits and to reconnect said first named set of devices to said circuits.

4. In a clock controlled radio receiver the combination comprising, radio receiver means adapted to be energized from a source of operating current, a tuning circuit and a volume control circuit for said receiver means, two sets of receiver tuning and volume control devices, a selector switch having contacts connected with said tuning and volume control circuits and with said tuning and volume control devices, said selector switch having an operating element movable to connect either of said sets of devices selectively to said circuits, a unitary control mechanism for said receiver having a movable switch actuating member for engaging and operating said selector switch operating element, said control mechanism comprising a single power switch operative to connect a source of operating current to said receiver means and means operative to close said power switch and to position said actuating member to operate said selector switch to connect one of said sets of devices to said circuits, said last named means including a movable timing control element operative to maintain said one set of devices in connection with said circuits and said power switch closed for a selectable length of time, means

in said control mechanism operative substantially simultaneously to open said power switch and to position said actuating member to operate said switch to disconnect said one set of devices from said circuits and to connect the other of said sets of devices to said circuits, and clock timing means connected with and operative to move said timing control element for said selectable length of time and to close said power switch at a preselected time after said selectable length of time.

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