

[54] **SELECTIVE PROGRAMMING
CONTROL SYSTEM FOR TUNING AND
RECORDING**

[72] Inventors: Willie L. Dozier, Norfolk, Va.;
James M. Carter, Jr., Washington,
D.C.

[73] Assignee: Top Aid Corporation

[22] Filed: Dec. 4, 1969

[21] Appl. No.: 882,192

[52] U.S. Cl. 179/100.11, 179/100.1 S, 318/467,
318/486, 325/396, 325/470, 325/471

[51] Int. Cl. G11b 31/00, H02p 3/00, H04b 1/32

[58] Field of Search 179/100.11, 100.1 PS; 334/8,
334/9; 325/393, 396, 469, 470, 471, 452;
318/486, 467; 178/DIG. 15, DIG. 13

[56] **References Cited**

UNITED STATES PATENTS

2,034,254	3/1936	Stenerson	325/396
2,209,084	7/1940	Foster	325/395
3,062,997	11/1962	Loyd	318/467

3,054,038	9/1962	Rast	325/396 X
2,059,279	11/1936	Rosenblum	325/393 X
2,097,901	11/1937	Thomas	179/100.11 X
2,538,497	1/1951	Bass	178/DIG. 13
2,815,440	12/1957	Fletcher	178/DIG. 13
3,027,506	3/1962	Stenhammar	325/396 X
2,805,331	9/1957	Wolford	329/396

Primary Examiner—Bernard Konick

Assistant Examiner—Raymond F. Cardillo, Jr.

Attorney—Clarence A. O'Brien and Harvey B. Jacobson

[57] **ABSTRACT**

A TV receiver is automatically tuned to a receiving channel during an interval of time, the channel and time interval being preselected through the keyboard of a programmer. During the preselected interval of time and for a short duration thereafter, operating voltage is supplied by the programmer to the receiver. Channel selection is achieved by motor advancement of a tuner control during the selected interval, the motor being deenergized when the tuner control reaches the preselected channel position.

2 Claims, 4 Drawing Figures

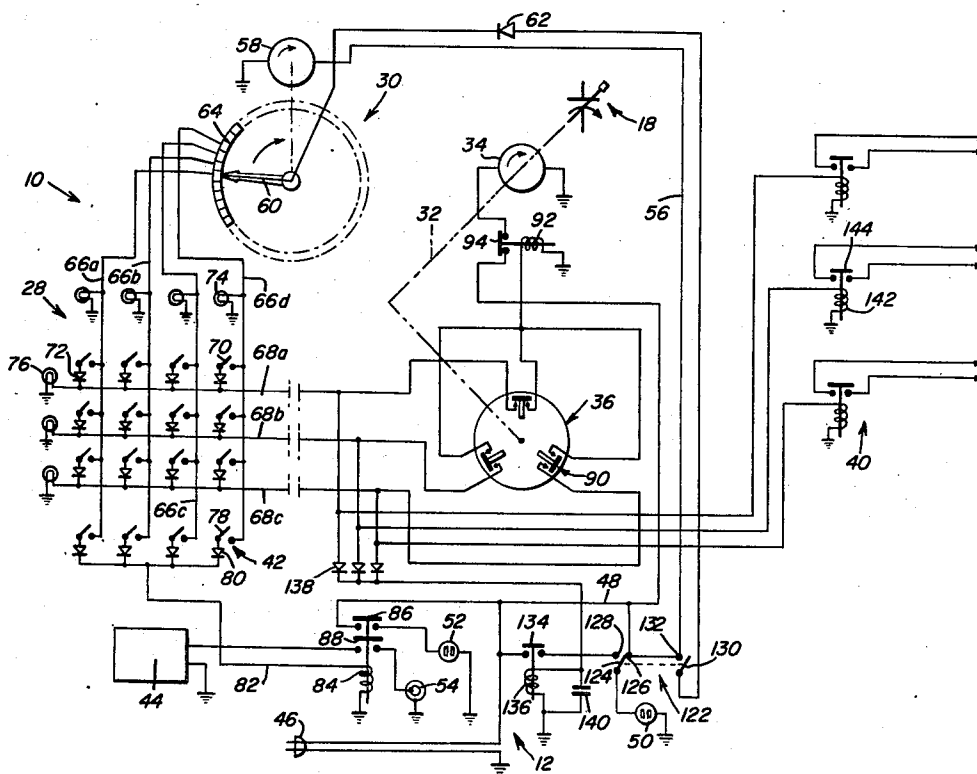


Fig. 3

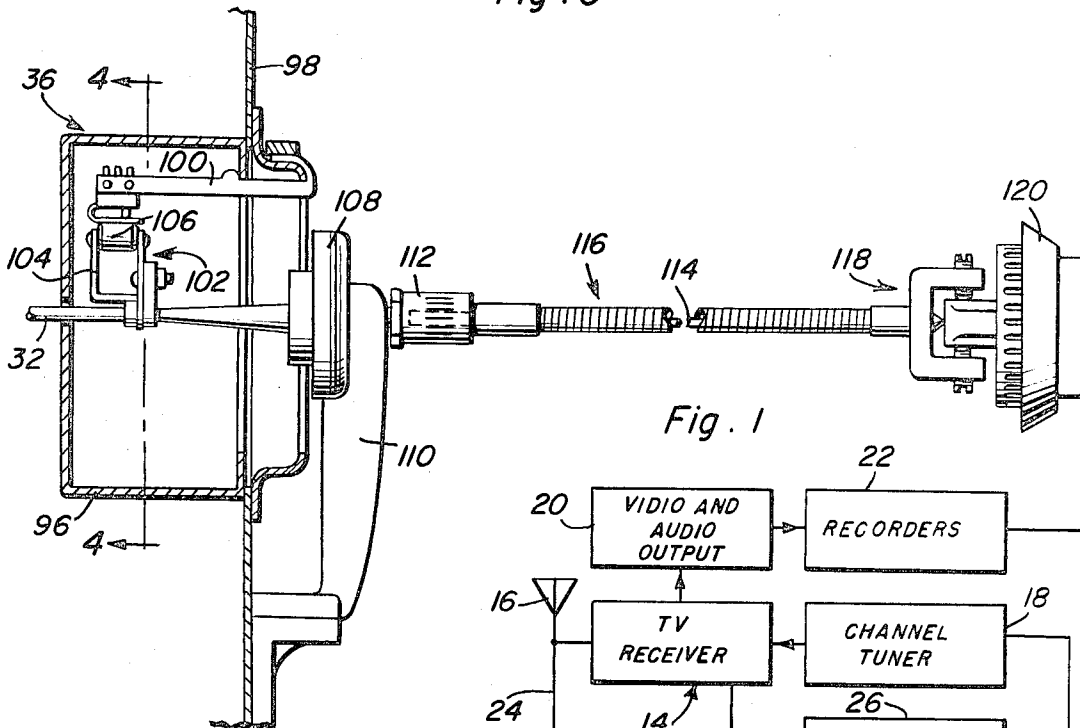


Fig. 1

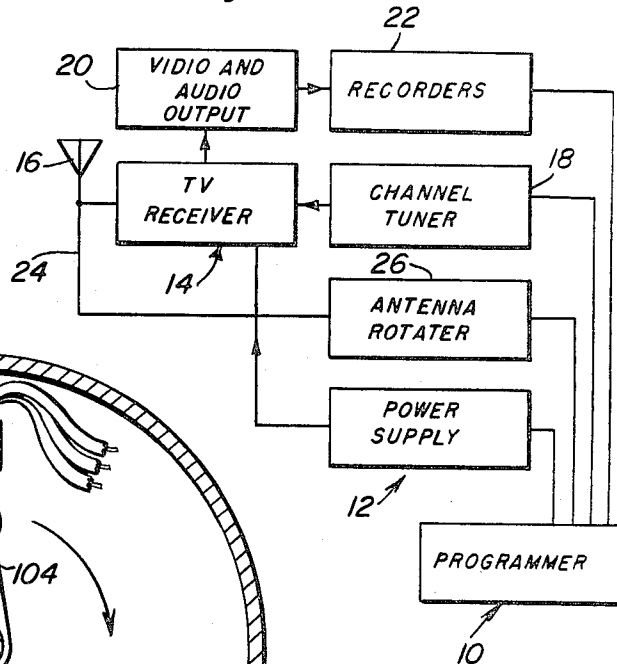
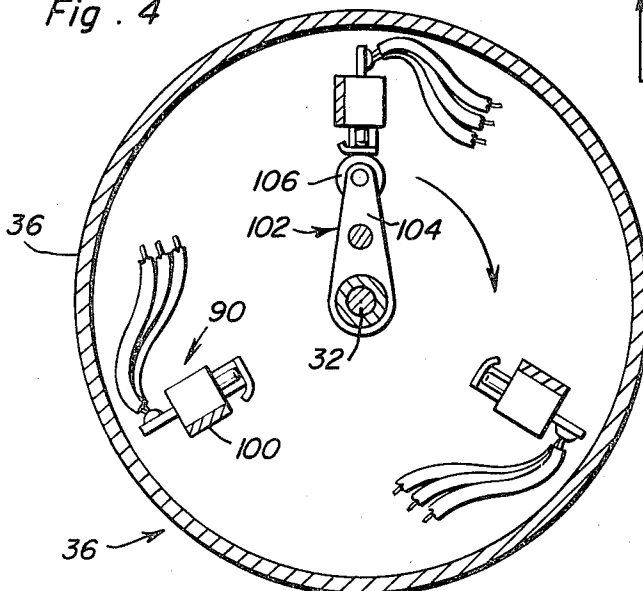


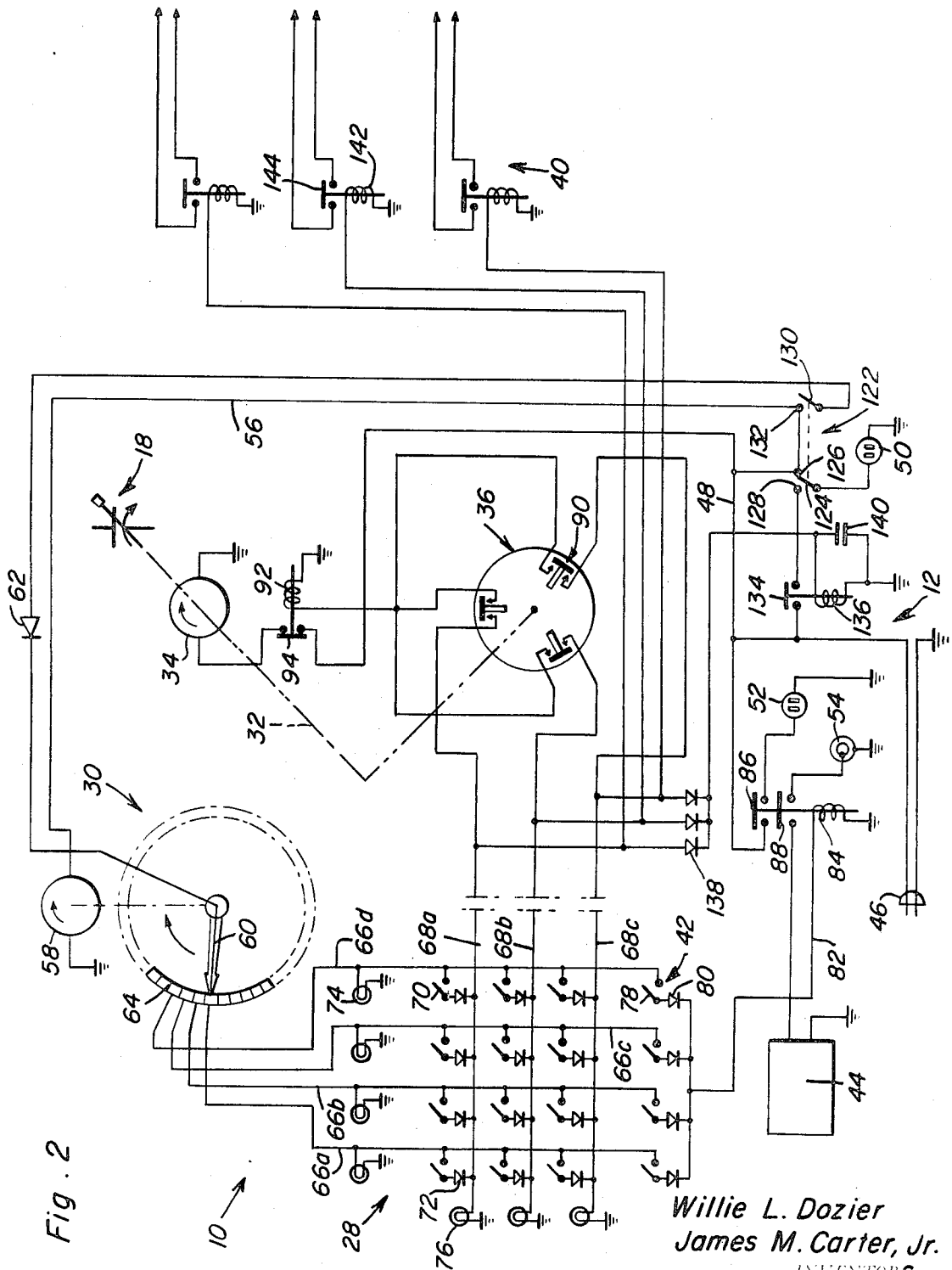
Fig. 4



Willie L. Dozier
James M. Carter, Jr.

INVENTORS

BY *Clarence A. O'Brien*
and *Harvey B. Jacobson*
Attorneys



Willie L. Dozier
James M. Carter, Jr.
INVENTORS

BY *Clarence A. O'Brien*
and Harvey B. Jacobson
Attorneys

SELECTIVE PROGRAMMING CONTROL SYSTEM FOR TUNING AND RECORDING

This invention relates to the programmed positioning of a control device for radiant energy receivers and/or other electrically powered devices and supply of electrical energy during preselected timing intervals to the electrically powered devices and more particularly to the programmed operation of television receivers and associated equipment.

Televised communication has become one of the most important information transmitting media for establishing a liason between man and his environment as well as the vast store of visual information being accumulated. It is, however, impossible when scheduling television broadcasts to meet the needs of all individuals. For example, it is impossible or inconvenient for any individual to monitor special current event programs at certain scheduled hours and recall the various program schedules of interest during any prescheduled period of time. Accordingly, as a solution to the foregoing problem, a multifunctional programming mechanism has been devised which is operative on a television receiver to control among other things its tuning and recording of selected broadcast material.

In accordance with the present invention, the programming system is capable of being programmed at the beginning of a prescheduled period of time so as to function automatically throughout this period of time by governing the operation of a channel tuning motor as well as to control the supply of operating power to the television receiver during preselected intervals of time. The programming system is furthermore operative to record selected broadcast material received by the television receiver as well as to operate accessory equipment such as a power controlled antenna rotor for insuring optimum reception by the television receiver of any signal to which it is automatically tuned.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIG. 1 is a schematic block diagram illustrating a typical installation for the system of the present invention.

FIG. 2 is an electrical circuit diagram corresponding to the programming mechanism associated with the system shown in FIG. 1.

FIG. 3 is a side elevational view with parts shown in section of the channel tuning control assembly associated with the present invention.

FIG. 4 is an enlarged transverse sectional view taken substantially through a plane indicated by section line 4-4 in FIG. 3.

FIG. 1 diagrammatically illustrates the general installation of the programming system in which a programmer component generally referred to by reference numeral 10 is associated with and controls a power supply component 12 through which operating current is supplied to a television receiver 14 with which a receiving antenna 16 is associated as well as a channel tuner component 18. The video and audio output component 20 associated with the receiver 14 may also be connected to recording equipment 22 while the antenna 16 may be adjustably positioned for optimum signal

reception by a rotor 24 driven by a power controlled antenna rotator component 26. Operation of the power supply 12, channel tuner 18, recording equipment 22 and antenna rotator 26, is automatically controlled in accordance with a preset program by the programmer component 10.

Referring now to FIG. 2, the programmer component 10 includes a selection keyboard assembly generally denoted by reference numeral 28 through which a person may select the various receiving channels to which the television receiver is to be tuned through the channel tuner 18, diagrammatically illustrated in FIG. 2, during preselected timing intervals as determined by a timing mechanism 30. The timing intervals may, for example, be of 30 minute duration during a total programming period of 24 hours. Thus, during a timing interval preselected through the keyboard 28, the tuning shaft or drive connection 32, as diagrammatically shown in FIG. 2, may be driven by a tuning motor 34 in order to advance the channel tuner through a plurality of operative positions corresponding to the respective receiving channels associated with a television receiver. The tuning motor 34 is de-energized to stop advancement of the tuning control at the operative position preselected through the keyboard 28 under control of a limit switch assembly 36 drivingly connected to the tuning motor 34 through the drive connection 32 and electrically wired to the selection keyboard 28. Operation of the antenna rotator 26 aforementioned, is controlled through an assembly of antenna position controlling relays 40 also wired to the selection keyboard 28. Power for operating the television receiver as well as other equipment from the power supply 12 is controlled by a timing interval selector assembly 42 which is wired to the timing mechanism 30 through the selection keyboard 28 as shown in FIG. 2.

With continued reference to FIG. 2, the power supply 12 includes a grounded source of d.c. voltage 44 having a 6 or 12 volt rating. Also, electrical energy is received from an available a.c. source at 117 VAC for example, through plug 46 to which a.c. voltage supply line 48 is connected. A.c. voltage is thereby supplied to the television receiver for operation thereof through a power receptacle 50 and to recording equipment through power receptacle 52 as will be described hereafter. D.c. voltage on the other hand is supplied through an input power jack 54 in the power supply component 12 to other recording equipment.

The a.c. voltage supply line 48 in the power supply component is connected by conductor 56 to a timer motor 58 associated with the timing mechanism 30 for continuous operation thereof. The timer motor drives an armature 60 through which current is conducted from the power supply 12 through diode 62 to one of the timing segments 64 engaged by the armature 60 as it is rotated through a 24 hour cycle, for example. The timing segments 64 are made of electrically conductive material mounted on a timing disc and non-conductively spaced from each other so as to conduct current during a 30 minute timing interval. Accordingly, in the illustrated embodiment, there will be 48 timing segments traversed by the armature 60 to which current is sequentially conducted. It will of course be appreciated that the number of timing segments and the duration of

the timing intervals associated therewith may be varied dependent upon the length of the programmed period.

Each of the timing segments 64 associated with the timing mechanism, is electrically connected to a timing interval conductor 66 associated with the keyboard 28 such as the interval conductors 66a, 66b, 66c and 66d. Also associated with the keyboard, are a plurality of channel selecting conductors 68 corresponding to the respective operative positions of the tuner such as the conductors 68a, 68b and 68c. A plurality of selector switches 70 are associated with the keyboard 28, each selector switch when actuated electrically connecting an associated timing interval conductor 66 with an associated channel selecting conductor 68 through a diode 72. Accordingly, when one of the selector switches 70 is closed, it completes a circuit through one of the conductors 66 so as to energize an associated indicator lamp 74. Also, upon closing of one of the selector switches 70, a circuit is completed through a selected conductor 68 to energize an associated indicator lamp 76. The indicator lamps 74 and 76 mounted on the selection keyboard 28 will therefore be illuminated during the preselected timing interval to signify the timing interval and channel selected.

Associated with each of the timing interval conductors 66, in the interval selecting assembly 42, is an interval selecting switch 78. Each of the switches 78 when actuated connects an associated conductor 66 through diode 80 and a common conductor 82 connected to the ungrounded terminal of a first power controlling relay coil 84 in the power supply component 12. Therefore, upon closing of one of the selector switches 78, the relay coil 84 will be energized under the automatic mode of operation of the programmer component during the selected timing interval in order to close the normally opened relay switches 86 and 88 associated with the relay coil 84. Upon closing of the relay switches 86 and 88 during the selected timing interval, the output of the d.c. power supply 44 is connected to the power jack 54 in order to supply d.c. voltage to some of the recording equipment as aforementioned while the a.c. voltage line 48 is connected to the power receptacle 52 through which the other recording equipment is energized. In this manner, program material received by the television receiver may be recorded on video and audio tape only during those timing intervals desired.

The channel selecting conductors 68 extend from the keyboard 28 to the limit switch assembly 36 and each of said conductors is connected to one of a plurality of normally closed limit switches 90 through which the associated conductors 68 are connected in parallel to the ungrounded terminal of a relay coil 92 with which relay switch 94 is associated. Current conducted through one of the conductors 68 energizing relay coil 92 during a selected interval, closes relay switch 94 thereby connecting the tuning motor 34 to the a.c. voltage line. The tuning motor 34 will then be energized to advance the tuner 18 through its operative channel turning positions until the limit switch 90 connected to the selected conductor 68 is opened to de-energize relay coil 92.

As shown in FIGS. 3 and 4, the limit switch assembly is enclosed within a housing 96 secured to the cabinet wall 98 of the programmer component. The limit switches 90 are adjustably mounted within the housing

96 by means of brackets 100 in circumferentially spaced relation to a switch actuator 102 mounted on the tuner motor shaft 32 which extends into the housing 96. The switch actuator includes for example an actuating arm 104 mounting a roller 106 at its radially outer end for sequential engagement with the limit switches 90 which are normally biased to a closed position. It will be appreciated, that the number of limit switches 90 mounted within the housing will correspond in number to the operative tuning positions of the shaft 32 and the channel selecting conductors 68 from the keyboard 28. The tuner motor shaft 32 is supported in position within the housing 96 by a bearing assembly 108 mounted by a support bracket 110 and is connected by a shaft coupling 112 to one end of a flexible wire 114 associated with a rotatable wire drive assembly 116. Thus, the tuner motor shaft 32 in addition to operating the limit switch assembly 36, is drivingly connected at a remote location through a coupling 118 to the television channel control knob 120 by means of which manual channel tuning is ordinarily effected.

The programmer component is set for automatic operation by displacement of the mode selector switch assembly 122 to the operative position other than that shown in FIG. 2 displacing the switch section 124 from contact 126 into engagement with contact 128. Switch section 130 ganged with the switch section 124 is also displaced into engagement with contact 132. Thus, in the automatic mode of operation, a.c. voltage is supplied through contact 132 and switch section 130 to the diode 62 from which current is conducted sequentially to the timing segments 64 in the timing mechanism. Also, a.c. voltage line 48 is connected to the television receiver through switch section 126, contact 128 and receptacle 50 only upon closing of the normally opened relay switch 134 associated with a second power controlling relay coil 136. The ungrounded terminal of the relay coil 136 is connected through a plurality of diodes 138 to the channel selecting conductors 68. Accordingly, only if one of the selector switches 70 is closed, will current be supplied through one of the diodes 138 to the relay coil 136 during the preselected timing interval in order to energize the relay coil 136 only during this timing interval. Energization of the relay coil 136 closes the relay switch 134 so that a.c. power from voltage line 48 will be supplied to the television receiver only during the timing interval and for a short delay period thereafter determined by a time delay capacitor 140 connected across the terminals of the relay coil 136 so as to store a charge therein while the relay coil is energized. The time delay capacitor 140 is thereby effective to compensate for power loss to the receiver during program selection and stabilization of the tuner and prevents the television tube from blinking out due to loss of operating power.

When the mode selection switch 122 is in its manual position illustrated in FIG. 2, a.c. power from voltage line 48 is directly applied through contact 126 and switch section 124 to the power receptacle 50 for continuous supply of operating voltage to the television receiver when manually switched on. The switch section 130 in the manual position of the mode selection switch is opened so as to disconnect power from the selection keyboard and the timing mechanism.

5

Connected to conductors 68 in parallel with the limit switches 90 of the limit switch assembly 36, are the ungrounded terminals of the relay coils 142 associated with the relay assembly 40. Accordingly, when a circuit is completed through one of the conductors 68 corresponding to a selected channel, a corresponding relay coil 142 is energized to close the normally opened relay switch 144 associated therewith thereby completing one of a plurality of antenna positioning circuits associated with the antenna rotator component 26 aforementioned as disclosed for example in U.S. Pat. No. 2,565,334 to Weingarden. Thus, for each channel selected, the antenna associated with the television receiver will be positioned for optimum signal reception.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

What is claimed as new is as follows:

1. In combination with a control device associated with one of a plurality of electrically powered devices and a source of electrical energy, a programming mechanism comprising a timer motor, a plurality of stationary interval segments, current conducting means driven by the timer motor for sequentially connecting the source to said interval segments, a plurality of voltage supply lines respectively connected to the interval

6

segments, a plurality of position selecting conductors, position selecting switch means for connecting each of the voltage supply lines to each of the position selecting conductors, a positioning motor connected to the control device, a plurality of normally closed control switches respectively connected to the position selecting conductors, switch actuating means driven by the positioning motor for sequentially opening the control switches, motor controlling relay means connected to the control switches for energizing the positioning motor from said source until one of the control switches is opened by the switch actuating means, first power controlling relay means for energizing another of the electrically powered devices from said source, interval selector switches connecting the voltage supply lines to the first power controlling relay means for continuously connecting said other of the powered devices to the source to energize the same only during a selected timing interval, second power controlling relay means connected to said position selecting conductors for energizing said one of the electrically powered devices during the selected timing interval, and capacitive delay means connected to said second power controlling relay means for prolonging energization of said one of the powered devices for a fixed delay period upon termination of the selected timing interval.

2. The combination of claim 1 including a third powered device connected to the position selecting conductors for energization during the selected timing interval.

* * * * *

35

40

45

50

55

60

65