

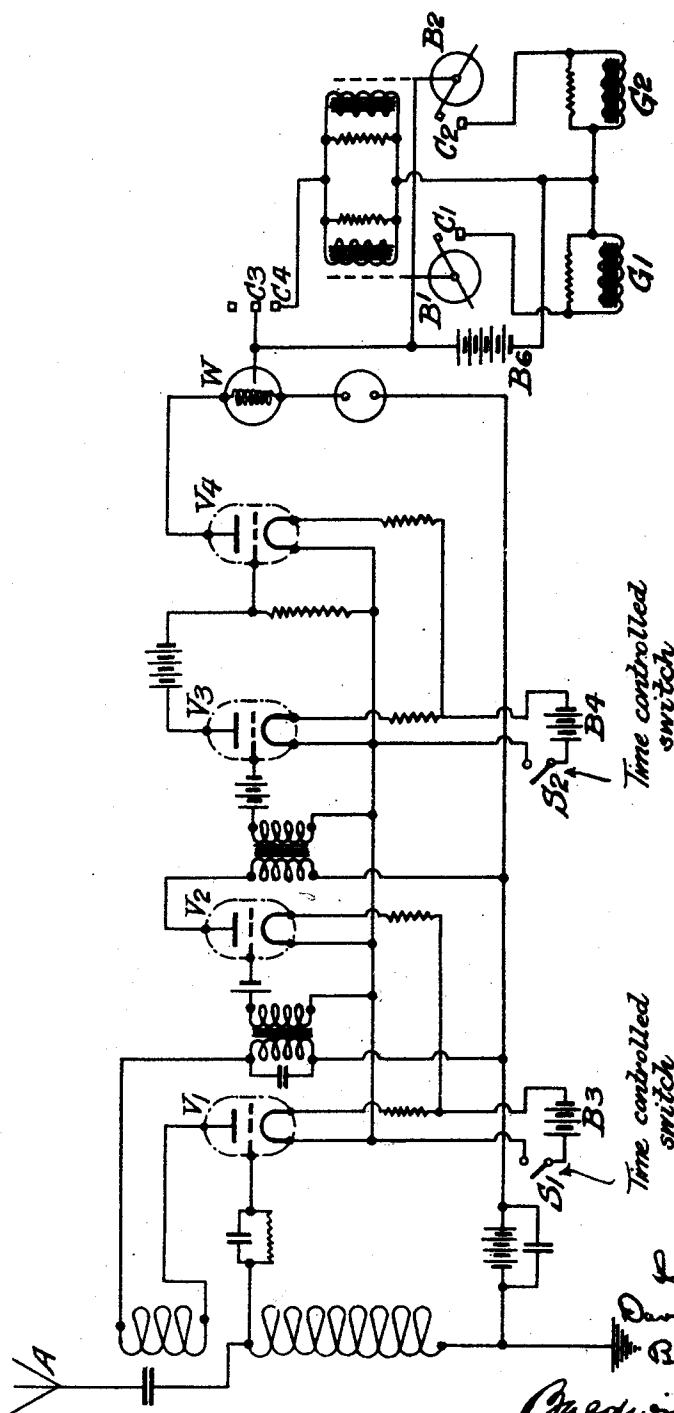
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RADIO REMOTE CONTROL DEVICE

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RADIO REMOTE CONTROL DEVICE

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This invention relates to wireless calling-up apparatus and wireless control apparatus, and is particularly suitable for use with automatic fog signals and lights, wireless call bells, alarms and similar devices.

Known arrangements of wireless calling-up apparatus and control apparatus consist essentially of a radio receiving device, adapted to perform some desired function upon receipt of a predetermined signal, and maintained continuously in a condition to receive. Where the radio receiving device comprises thermionic valves, as in practice, it nearly always does, the valves are by the known arrangements energized continuously, an arrangement which clearly militates against long life, and certainty of action, and requires continuous consumption of electrical energy.

One object of the present invention is to provide a wireless control apparatus in which the life of the valves is increased.

Another object is to provide a wireless control apparatus in which the consumption of electrical energy is reduced.

Yet another object is to provide a wireless control apparatus having greater certainty of action.

Other objects and advantages shall hereinafter appear.

Wireless control apparatus in accordance with the present invention comprise a thermionic valve receiving device, an automatic actuating device controlled thereby, and a time control device adapted to switch on the thermionic valve or valves at predetermined intervals and/or for predetermined periods the thermionic receiving device being arranged to prevent operation of the actuating device if a predetermined signal be received for predetermined periods and/or at predetermined intervals.

If desired two or more thermionic valve receiving devices may be provided and the time control device arranged to switch them on in rotation.

If desired the transmitter from which the controlling signals are sent may be provided with a transmitter control device, synchronized in manner known in the art (for ex-

ample, by wireless) with the time control device at the receiving station or stations, so that calling-up or other signals are sent only at those times when the receiver or receivers is or are in a condition to receive such signals.

The invention is widely applicable for all purposes of wireless control and though not limited thereto is especially applicable to the control of an automatic fog gun or other warning device. When so applied the arrangement may be such that the warning device is automatically set into operation unless the receiving device controlling the warning device receive a predetermined signal at predetermined intervals. For example, the receiving device may be switched in for a quarter of a minute, every ten minutes and be adapted to prevent operation of the warning device only so long as a predetermined signal be received every such quarter of a minute. The said signal may be arranged to be transmitted for or during every such quarter of a minute by means of a synchronized transmitter control device at the transmitter and, in the event of fog, the said device would be switched out of commission by an attendant or by any known control means.

Preferably the time control device comprises a clock switch adapted to open and close the filament circuit or circuits of the radio receiver, either directly or through relays. The transmitter control device may similarly comprise a clock switch, and the two clock switches may be synchronized in known manner preferably by wireless.

The invention may be explained by an example. The clock, at a receiving station, where there is wireless apparatus arranged for calling up or ringing up, is adapted to switch off the current to the valves thereof for say, $9\frac{3}{4}$ minutes, during which time the station in consequence cannot be called up or rung up. The clock then switches on the valves for, say, a quarter of a minute, during which time the transmitting station can call up or ring up the receiving station, as the valves have now been put in circuit by the clock. At the end of the quarter of a minute, the clock switches off the valves for $9\frac{3}{4}$

minutes, and so on. The valves are thus in circuit for only 36 minutes in a day's run in place of 1,440 minutes had the valves been continuously in circuit. The length of the periods in which the valves are off or on, can be arranged to suit the circumstances. A saving in the lives of valves and increased certainty of operation are thus effected, while the consumption of energy is reduced. Another application of the clock giving greater certainty of action is obtained, in the case especially of wireless control to places including situations where there is no attendant at the receiving or controlled station, by utilizing a clock in the manner already explained, but instead of switching the same valve or set of valves into circuit at every, say 10 minutes interval, the clock is arranged to switch on a duplicate valve or duplicate set of valves alternately, so that the station may have "two strings to its bow", so that if one set of valves becomes burnt out, or ineffective for any other reason, the other set of valves will, if they be in good order, be ready to operate the next time that the clock switches on. Several sets of valves can be similarly arranged in the wireless system to give even greater certainty of control.

The clock can, if required, switch off and on not merely the valves and batteries, but the whole or part of the wireless set or a telephone or telegraph wireless set.

The invention is illustrated in the accompanying drawing, which shows in diagrammatic form a receiver circuit of known general type, adapted in accordance with this invention.

Referring to the figure, A is an aerial, V1 a rectifying thermionic valve and V2 and V3 are low frequency amplifying valves. Signals received upon the aerial A and rectified and amplified by valves V1, V2 and V3 are applied across the grid circuit of the valve V4 in whose anode circuit is connected a sensitive moving coil relay W. Contacts C3, C4 of the relay W are connected as shown to a battery B6 and to the windings of two tuned balance wheels B1, B2, which may be, for example, of the type described in the specification of British Patent No. 11,106 of 1913. Contacts C1, C2 of the wheels B1, B2 are connected in circuit with the operating or controlling windings G1, G2 of an actuating device or devices, which may be, for example, electromagnetic valves controlling the admission and cut-off of acetylene gas to a fog signal gun.

The filaments of the valves are heated from batteries B3 and B4, through the switches S1 and S2. These switches are under the control of a clock or other time device, and may be closed, for example, for a quarter of a minute every 10 minutes. The arrangement is such that when the switches S1, S2

are closed, the receiver circuit is in a condition to receive signals.

In operation the transmitting station sends a series of timed signals, adapted to influence the correspondingly tuned balance wheel, and thereby to set in operation or shut down the warning device according to which balance wheel is influenced.

Inasmuch as the switches S1 and S2 close at predetermined time intervals, the receiving system is rendered operative at such predetermined time intervals. During these time intervals the transmitter which is synchronized for operation with the receiver is normally sending a control signal to which the receiver is responsive, which control system operates relay W and opens the circuit to the windings of the tuned balance wheels B1 and B2. If, however, the transmitter is not emitting a control signal during the time intervals that the receiving apparatus is activated, the balance wheels are actuated to close the control circuits for performing the desired functions or giving a warning of the failure of the transmitter operation.

It will be understood that the invention is not limited to fog warning devices, but is generally applicable to radio control devices.

While I have described a preferred embodiment of my invention it will be understood that modifications may be readily made and that the principles of my invention may be applied in numerous ways. The application of my invention as described herein is to be considered in an illustrative sense and as not limiting my invention, and it will be understood that modifications may be made within the scope of the appended claims without departing from the spirit of my invention.

What I claim is:—

1. In radio control means, thermionic radio receiving means, automatic actuating means, means for restraining said automatic actuating means from operating, automatic time controlled switching means connected with said thermionic receiving means, to render said means operative at predetermined times, said thermionic receiving means being connected to operate said restraining means whereby the actuating means are prevented from operating so long as a signal synchronously transmitted at predetermined time intervals is incident upon said receiving means during the time intervals that said receiving means are rendered operative.

2. In radio control means, thermionic radio receiving means, automatic actuating means, time controlled switching means connected with said thermionic receiving means, means interconnecting said last mentioned means with said actuating means and circuits for restraining the operation of said actuating means so long as a signal synchronously transmitted at predetermined time

intervals is incident upon said receiving means during the time intervals that said receiving means are rendered operative.

3. In radio control means, a plurality of thermionic radio receiving means, automatic actuating means, time controlled switching means connected with said thermionic receiving means for rendering said receiving means operative over predetermined time intervals, and means connecting said receiving means with said actuating means and mechanically tuned means for restraining the operation of said actuating means to prevent operation thereof so long as a signal synchronously transmitted at predetermined time intervals is incident upon said receiving means during the time intervals that said receiving means are rendered operative.

4. In radio control means, a plurality of thermionic radio receiving means, automatic actuating means, time controlled switching means connected with said thermionic receiving means for rendering said receiving means operative over predetermined time intervals, and mechanically balanced means responsive to a predetermined signal for interconnecting said receiving means with said actuating means to prevent operation thereof so long as a signal synchronously transmitted at predetermined time intervals is incident upon said receiving means during the time intervals that said receiving means are rendered operative.

5. In radio control means, thermionic radio receiving means, automatic actuating means, time controlled switching means connected with said thermionic receiving means, means for interconnecting said last mentioned means with said actuating means and mechanically balanced and tuned means for restraining the operation of said actuating means to prevent operation thereof so long as a signal synchronously transmitted at predetermined time intervals is incident upon said receiving means during the time intervals that said receiving means are rendered operative.

6. In radio control means arranged to be actuated by signals transmitted automatically over predetermined time periods, thermionic radio receiving means, automatic actuating means, time controlled switching means connected with said thermionic receiving means, means for interconnecting said last mentioned means with said actuating means and a mechanically balanced circuit closer for controlling the connection between said receiving and actuating means and restraining the operation of said actuating means to prevent operation thereof for the time intervals determined by the time controlled switching means and the synchronized transmission of said signals to which said receiving means is responsive.

7. In radio control means arranged to be

actuated by signals transmitted automatically over predetermined time periods, a plurality of thermionic radio receiving means, automatic actuating means, time controlled switching means connected with said thermionic receiving means for rendering said receiving means operative over predetermined time intervals, means interconnecting said last mentioned means with said actuating means, a mechanically tuned circuit closer for controlling the connection between said receiving and actuating means and restraining the operation of said actuating means to prevent operation thereof for the time intervals determined by the time controlled switching means and the synchronized transmission of the signals to which said receiving means is responsive.

8. In radio control means, arranged to be actuated by signals transmitted automatically over predetermined time periods, a plurality of thermionic radio receiving means, automatic actuating means, time controlled switching means connected with said thermionic receiving means for rendering said receiving means operative over predetermined time intervals, means electrically connecting said last mentioned means with said actuating means, a mechanically tuned and balanced circuit closer for controlling the connection between said receiving and actuating means and restraining the operation of said actuating means to prevent operation thereof for the time intervals determined by the time controlled switching means and the synchronized transmission of the signals to which said receiving means is responsive.

9. In radio control means, arranged to be actuated by signals automatically and synchronously transmitted to a receiver over predetermined time intervals, thermionic radio receiving means, automatic actuating means, time controlled switching means connected with said thermionic receiving means, means electrically connecting said last mentioned means with said actuating means and a multiplicity of mechanical means for restraining the operation of said actuating means to prevent operation thereof for the time intervals determined by the time controlled switching means and the synchronized transmission of the signals to which said receiving means is responsive.

10. In radio control means arranged to be actuated by signals automatically and synchronously transmitted to a receiver over predetermined time intervals, thermionic radio receiving means, automatic actuating means, time controlled switching means connected with said thermionic receiving means, means electrically connecting said last mentioned means with said actuating means and a movable member mechanically balanced to restrain the operation of said actuating means to prevent operation thereof for the

time intervals determined by the time controlled switching means and the synchronized transmission of the signals to which said receiving means is responsive.

5 11. In radio control means arranged to be actuated by signals automatically and synchronously transmitted to a receiver over
predetermined time intervals, a plurality of
10 thermionic radio receiving means, automatic actuating means, time controlled switching means connected with said thermionic receiving means for rendering said receiving means operative over predetermined time intervals, means electrically connecting said
15 last mentioned means with said actuating means and a mechanical movement restrained in operation to prevent operation thereof for the time intervals determined by the time controlled switching means and the
20 synchronized transmission of the signals to which said receiving means is responsive.

12. In radio control means arranged to be actuated by signals automatically and synchronously transmitted to a receiver over
25 predetermined time intervals, a plurality of thermionic radio receiving means, automatic actuating means, time controlled switching means connected with said thermionic receiving means for rendering said receiving
30 means operative over predetermined time intervals, means electrically connecting said last mentioned means with said actuating means and a pair of mechanically tuned circuit closers each restrained in movement to
35 prevent operation thereof for the time intervals determined by the time controlled switching means and the synchronized transmission of signals to which said receiving means is responsive.

40 13. An automatic signal system for the synchronous transmission and reception of signals over predetermined time intervals, a receiving circuit, electromagnetic control means connected thereto, a responsive means,
45 time controlled means controlling said receiving circuit for rendering said receiving circuit effective or ineffective at time intervals corresponding to the synchronized transmission of signals and means for restraining the operation of said electromagnetic control means depending upon the
50 transmission intervals whereby said responsive means are prevented from operating for the time intervals determined by the time controlled switching means and the synchronized transmission of signals to which said receiving means is responsive.

In testimony that I claim the foregoing as my invention I have signed my name this 11
60 day of February, 1927.

D. ALAN STEVENSON.