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RADIO RECEIVER AND TROUBLE ALARM

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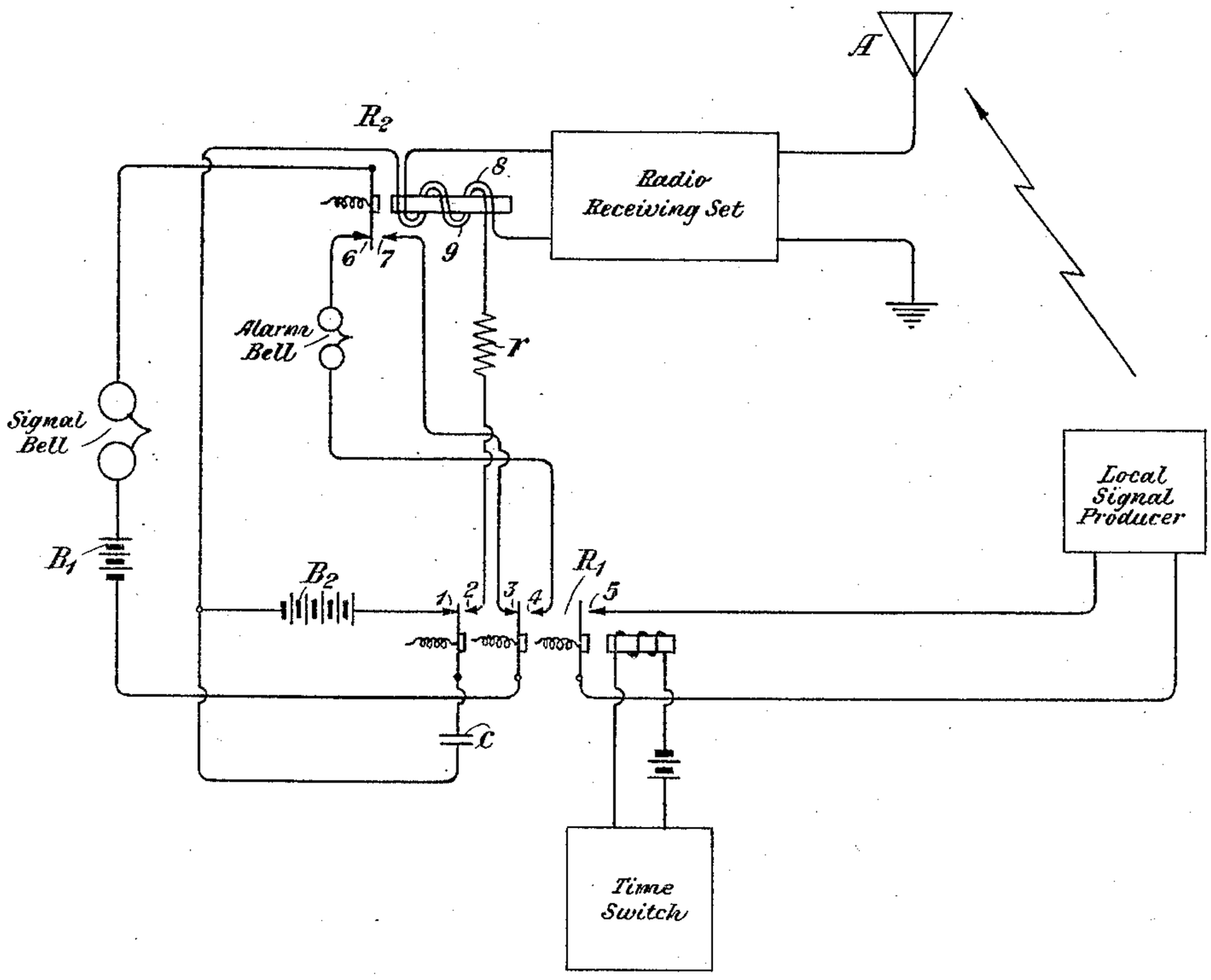

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RADIO RECEIVER AND TROUBLE ALARM.

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My invention relates to radio receiving sets, and more particularly to radio receiving sets equipped with so-called "trouble alarms."

It is the principal object of the invention to provide, in connection with a radio receiving set, improved means for continually and automatically testing the set and giving an alarm in case the set for any reason becomes inoperative.

The invention is applicable to any radio receiving set which may need to be kept in continuous operation, but more particularly to sets which are to be kept in such operation without attendance.

Briefly, the desired result is attained by the use of a local signal producer and means for periodically and simultaneously setting in operation this local signal producer and making a plurality of local circuit connections—this latter operation causing an alarm to be given if the receiving set is inoperative, but not if the set is in operative condition.

It is proposed to describe in detail, for the purpose of illustration, the application of the invention to a receiving set designed to receive distant signals and to cause the operation of a signal bell in response thereto, a separate bell being provided to announce a trouble alarm. It is to be understood, however, that the scope of the invention is not limited by this illustrative description of a specific application but is defined by the appended claims.

The following detailed description is to be read with reference to the accompanying drawing which shows diagrammatically this desirable arrangement of the circuits.

With reference to the details of the drawing, the radio receiving set is associated with the antenna A and is connected in circuit with the winding 8 of a relay R_2. In its normal operation in response to distant signals the receiving set causes the operation of the relay R_2. The operation of this relay closes the contact 7 and completes a circuit through contact 3 including the signal bell and the battery B_1. The result is the operation of the signal bell.

An automatic time switch is arranged to close periodically—say, for ten seconds every five minutes. In circuit with this time switch are a battery and the winding of a relay R_1. When the time switch closes, this relay operates, opening normally closed contacts 1 and 3 and closing contacts 2, 4 and 5, all normally open. The closing of contact 5 completes a circuit through a local signal producer, which thereupon sends a local signal to the receiving set. This local signal is of such a nature as to be capable of traversing the selective circuits of the receiving set and producing at the output of the set a detected component of current suitable for operating the relay R_2.

A condenser C is normally connected through contact 1 in circuit with a battery B_2, being thus normally charged by the battery. Upon the operation of the time switch and the relay R_1 the left-hand armature of the relay is pulled from contact 1 to contact 2, allowing the condenser C to discharge through the resistance r and an auxiliary winding 9 of the relay R_2. This discharge of the condenser operates relay R_2 and pulls the armature of that relay over from contact 6 to contact 7, this contact being held closed for a period of time sufficient to allow the local signal to traverse the radio receiver if the set is operative.

An alarm bell is placed in the system as shown in the drawing. The circuit including this alarm bell is normally open, since, although contact 6 of relay R_2 is closed, contact 4 of relay R_1 is open.

When relay R_1 operates in response to the closing of the time switch, the middle armature of the relay is moved from contact 3 to contact 4, thus placing the signal bell, the battery B_1 and the alarm bell in a circuit which may be controlled at contact 6. Since a considerable period of time is required for the local signal to traverse the radio receiver when the latter is operative, an alarm would be sounded in response to the operation of the time switch unless the circuit traced above were broken temporarily at 6. This breaking of the circuit including the bells, is the function of the discharge of the condenser C through the auxiliary winding 9 of the relay R_2. The time of the making of the contact 7 is dependent upon the values of the condenser capacity C, the resistance r, and the inductance of relay R_2. This time is so adjusted that if the receiving set is in operative condition, the electromagnet of relay R_2 will be energized by the current in winding 8 before the armature of the relay falls back from contact 7 to contact 6, and

consequently contact 7 will be held closed, the result being that the operation of the bells is prevented.

If, however, the radio receiving set is not in operative condition, the armature of relay R_2 will drop back to contact 6 before relay R_1 releases and opens contact 4. Accordingly the circuit through the battery B_1 and the two bells will be closed and an alarm will be sounded along with the sounding of the signal bell, indicating in response to the test that the receiving set is out of order. The operation of the bells will of course cease when relay R_1 releases upon the re-opening of the time switch.

I claim:

1. In association with a radio receiving set responsive to distant and local signals, a signal annunciator, means for actuating said signal annunciator in response to distant signals, means for announcing an alarm, a signal producer designed to transmit a local signal to the receiving set, means for periodically setting in operation said signal producer and simultaneously therewith rendering said alarm announcing means temporarily inoperative, and means for maintaining the inoperative condition of the alarm announcing means if the receiving set is operative and for destroying said condition and operating said means if the receiving set is inoperative.

2. In association with a radio receiving set responsive to distant and local signals, a signal annunciator, means for actuating said signal annunciator in response to distant signals, a normally open alarm circuit, an alarm annunciator therein, a signal producer designed to transmit a local signal to the receiving set, means for periodically setting in operation said signal producer and simultaneously therewith preparing the alarm circuit to be adapted to the condition of the receiving set, and means for holding said alarm circuit open if the receiving set is operative and for closing said circuit if the set is inoperative.

3. In association with a radio receiving set normally responsive to distant and local signals, a signal annunciator, means for actuating said signal annunciator in response to distant signals, means for announcing an alarm, a signal producer designed to transmit a local signal to the receiving set, a normally charged condenser, a periodically closing time switch for operating said signal producer, means controlled by the closing of said time switch for discharging said condenser, means controlled by the operation of said time switch for operating said alarm announcing means if the receiving set fails to respond to the local signal, and means controlled by the discharge of said condenser for preventing the operation of said alarm announcing means if the receiving set responds to the local signal.

In testimony whereof, I have signed my name to this specification this 14th day of July, 1926.

RALPH K. POTTER.