

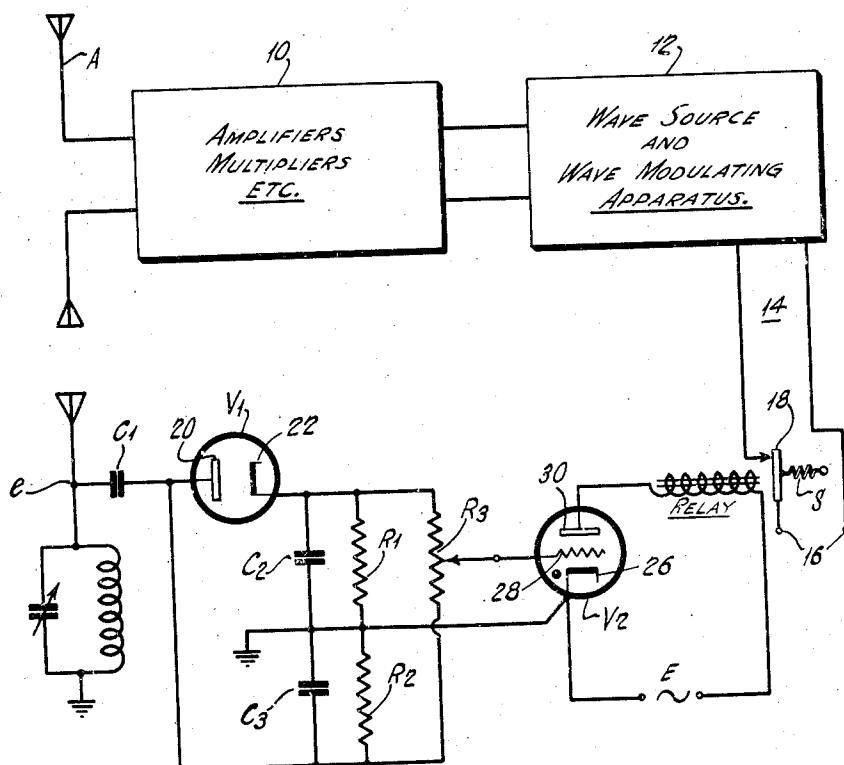
Aug. 16, 1949.

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2,479,548

CONTROL CIRCUIT

Filed March 15, 1945



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2,479,548

CONTROL CIRCUIT

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Application March 15, 1945, Serial No. 582,949

5 Claims. (Cl. 250-17)

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This application relates to transmitter control circuits and more specifically to improved apparatus actuated by a change in the magnitude of the output of a transmitter or a similar circuit for rendering the same inoperative when the output thereof is not as desired.

The primary object of my invention is improved transmitter monitoring and control.

An additional object of my invention is provision of a transmitter control system which adapts itself to transmitter outputs of different magnitude so that once it is installed and adjusted the transmitter output may be changed to meet various requirements without making any changes in the control system.

In describing my invention in detail, reference will be made to the single figure in the attached drawings wherein I have illustrated by block diagram a wave energy generator, modulator and transmitter with a control circuit arranged in accordance with my invention for breaking a transmitter circuit or operating on the same in some manner to render the transmitter inoperative if the output falls.

In the drawings, 10 represents amplifiers, multipliers, etc., the output of which are coupled to an antenna A, and the input of which are coupled to an exciter 12 such as, for example, a wave energy source and wave modulating apparatus. The exciter 12 or if desired the amplifiers, multipliers, etc. in 10 includes as an operating circuit the circuit 14 which may be connected at points 16 to, for example, a source of potential so that when the circuit is completed by relay armature 18 the apparatus in the exciter is operative, and when the circuit is interrupted by movement of relay armature 18 by the spring S the exciter is inoperative to supply output to the multipliers and amplifiers and thence to the antenna.

The circuit 14 need not be a power supply circuit as described above but may be of any character, so long as it performs the desired operation on the transmitter. Circuit 14 normally closed by contact 18 may act through a second relay to hold open a shunt or short circuit which when closed stops operation of the transmitter.

In any event the arrangement is such that if there is a sudden reduction of output power from the transmitter such as would result from an arc over or other failure in circuits between the transmitter and antenna the transmitter may be taken off the air by opening the circuit including armature 18.

To accomplish this operation a voltage e picked up from the transmitter by radiation or by cou-

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pling thereto is supplied to the anode 20 of a diode V1, the cathode 22 of which is connected to a resistive network comprising R1, R2 and R3, with R1 shunted by C2, and R2 shunted by C3. A point on the network at the adjacent ends of R1 and R2 is coupled to the cathode 26 of the tube V2. The adjustable point on R3 is connected to the control grid 28 of V2. The anode 30 of V2 is connected to the winding of a relay having a contact closing armature 18. A source of alternating potential E may connect the relay winding to the cathode of tube V2.

The voltage e is rectified by V1 and fed to the network. C1 is the conventional rectifier input capacitor. R1 and R2 are approximately equal but C3 is of somewhat higher capacity than C2 which may be an R. F. bypass capacitor. The tube V2 is a Thyatron of the type wherein a negative bias on the grid prevents the same from firing but as the negative potential is reduced the tube fires before the grid becomes zero or positive. The voltage e is rectified and current flows in R1 and R2 and the potentials developed across R1 and R2, with respect to the cathode 26 of tube V2, are of opposed polarity and buck. The potentiometer R3 is so adjusted (slightly negative but not cutoff) that tube V2 which is of the Thyatron type is just fired when the voltage e is such as provided by normal transmitter operating conditions. Now if the input to the rectifier, i. e., voltage e , is suddenly reduced, because of a fault in the transmitter system, capacitor C2 is discharged more rapidly than C3 because of its small storage capacity. The positive potential at the cathode, tube V1, end of R1 and R3 drops rapidly (because C2 is small), and this potential no longer equals the negative voltage developed at the anode, tube V1, end of R2 and on the adjacent end of R3 by virtue of the large condenser C3 which is slower to discharge. This more negative potential is applied by the potentiometer R3 tap to the grid of tube V2, momentarily cutting off the plate current normally resulting from the alternating current voltage E. This opens the relay contacts which may be connected as stated above in the proper transmitter control circuits to shut off the transmitter.

Now when circuits controlled by completing 14 have stopped operation of the transmitter, voltage at e becomes zero, no bias is developed between cathode and control grid of tube V2, which draws current to close relay 18. This, however, does not turn the transmitter on unless the operator chooses to restart the same by completing the circuits controlled by 14. It is apparent that

the network C2, C3, R1, R2 once properly adjusted will adapt itself to a fairly wide range of transmitter outputs without adjustment. This is because the operation depends on a change in the magnitude of e and the differential of the time constant of the condensers C2 and C3. The only effect will be a change in the sensitivity of the device, since as the steady state magnitude of e is reduced tube V2 is not as critically biased, and a greater change in e will be required to cutoff the plate current of tube V2.

The circuit 14 is described as a transmitter operation control circuit. It will be obvious, however, that the circuit 14 may operate an alarm to attract the operator's attention so that he can turn the transmitter off.

What is claimed:

1. In apparatus for controlling the conductivity of a discharge device having electrodes including a control grid and cathode, two resistors of substantially like size connected in series, a connection between adjacent ends of said resistors and the cathode of the device, a capacitor in shunt to each resistor, said capacitors being of unlike size, a rectifier in a rectifier circuit including said resistors as a rectifier load, a connection between the control grid of said device and a selected point on said rectifier load and means for applying alternating current to said rectifier whereby a potential is developed between said control grid and cathode which changes when the alternating current magnitude changes.

2. Apparatus as recited in claim 1 wherein said last named means is a source of alternating current coupled to said rectifier and wherein said last named source includes a circuit with contacts one of which is movable to block output from the source and wherein the device includes an anode in a circuit with a relay winding cooperating with an armature for controlling the position of said movable contact.

3. In combination with a source of wave energy, a circuit including a pair of contacts one of which is movable to put said source of wave energy into or out of operation, a discharge device having electrodes including an anode, a cathode and a control grid, two resistors of substantially like size connected in series, a connection between adjacent ends of said resistors and the cathode of said device, a capacitor in shunt to each resistor, said capacitors being of unlike size, a rectifier tube in a rectifier circuit including said resistors in series as a rectifier load, said rectifier having a cathode connected to the free end of the resistor shunted by the smaller capacitor and having an anode connected to the free end of the resistor shunted by the larger capacitor, a resistor in shunt to said series resistors, a connection between the control grid of said device and said shunt resistor, a relay having a winding and an armature associated with said movable contact, a circuit connecting said winding to the anode and cathode of said device and a coupling

between said source of wave energy and said rectifier.

4. In apparatus responsive to changes in the output of an alternating current generator, a gaseous discharge device having a control grid, a cathode and an anode, a source of alternating current and a current intensity responsive means in a circuit including the impedance between the anode and cathode of the device, a network comprising two resistors of substantially equal resistance in series, capacitors of different capacity in shunt to said resistors, a rectifier having an anode and a cathode in a rectifier circuit including as a load impedance said two resistors, a coupling between said rectifier and said generator output to excite the rectifier by a portion of the generator output to cause rectified current to flow in said resistors, a connection from the adjacent terminals of the resistors to the cathode of said device, and a coupling between a second point on the network and the grid of the device for applying a portion of the potential drop across said resistors to said grid.

5. In apparatus responsive to failure or reduction of output from a wave energy transmitter, a gaseous discharge tube having a control grid, a cathode and an anode, a relay winding in the anode to cathode circuit, an armature adjacent the winding, the position of which depends on the magnitude of the current through the winding which in turn depends on the conductivity of the tube, a network comprising two resistors in series each shunted by a capacitor, said capacitors being of unlike capacity, a connection between adjacent terminals of the resistors and ground and the cathode of said tube, a potentiometer resistance shunting said resistors, an adjustable connection between the grid of said tube and the said potentiometer resistance, a rectifier having an anode and cathode in a rectifier circuit in series with said resistors and a coupling between the rectifier and the transmitter output to excite the rectifier by energy from the transmitter to cause rectified current to flow in said resistors, the larger of said capacitors being in shunt to the resistor between the anode of the rectifier and ground, the point on said potentiometer connected to said grid being adjusted so that the potential at said point and on the tube grid fires the gas tube under normal transmitter output.

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