

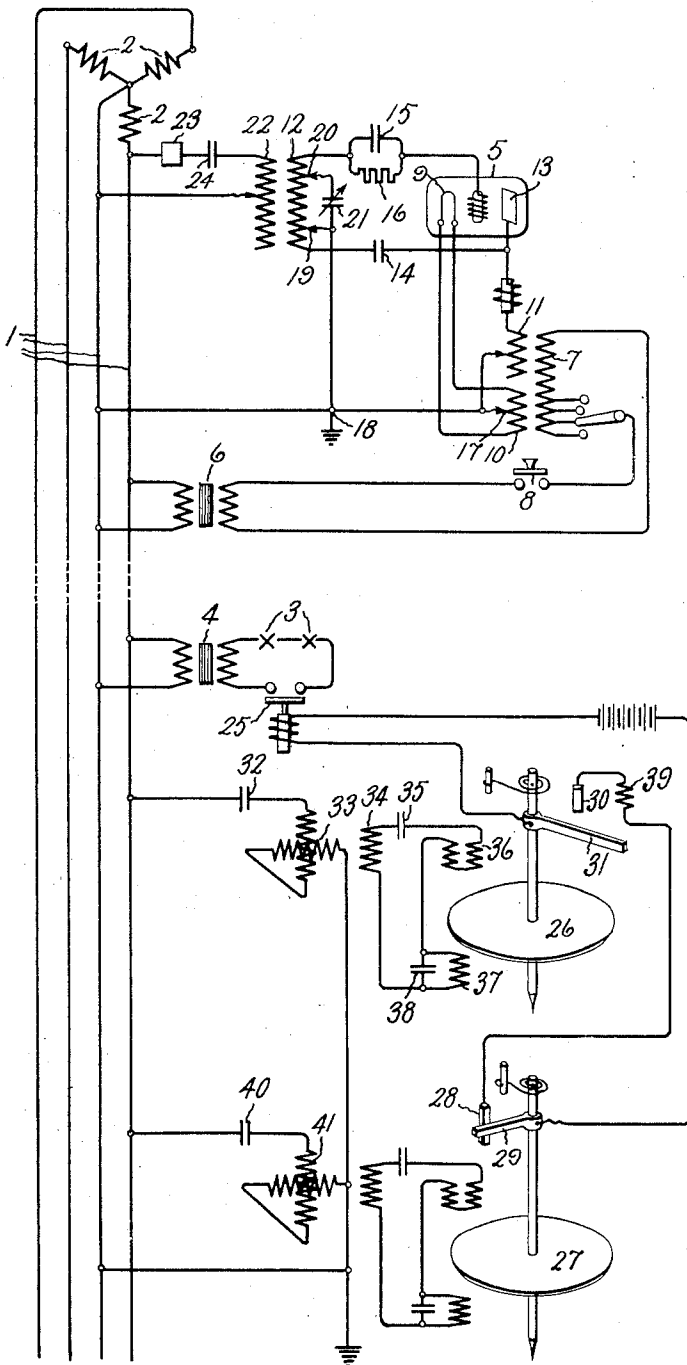
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CONTROL SYSTEM

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UNITED STATES PATENT OFFICE.

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CONTROL SYSTEM.

Application filed February 2, 1923. Serial No. 616,630.

My present invention relates to systems for controlling the operation of electrically actuated devices, and more particularly to systems in which the operation of such devices is controlled by means of currents transmitted to the devices from a distant point.

One of the objects of my invention is to provide a simple and efficient means for actuating an electrical device or devices from a distant point by means of currents of such characteristics that a desired device or devices may be actuated without operating other devices which may be connected to the distribution system over which the controlling currents are transmitted.

A further object of my invention is to provide a device which may be actuated by a current having a given characteristic such as a predetermined frequency and which will not be actuated by currents having different characteristics.

Still another object of my invention is to provide a means for transmitting control currents over a distribution system which is employed for other purposes than the transmission of control currents and which is so arranged that the operation of the controlled means will be independent of currents which may be transmitted over the distribution system for other purposes.

The novel features which I believe to be characteristic of my invention are set forth with particularity in the appended claims. My invention itself, however both as to its organization and method of operation will best be understood by reference to the following description taken in connection with the accompanying drawing in which I have indicated diagrammatically one way whereby my invention may be carried into effect.

I have shown in the drawing a distribution system comprising conductors 1 which may be supplied with current from the secondary windings 2 of a three-phase Y connected transformer with grounded neutral. The currents supplied to this distribution system may be employed for the operation of any electrical apparatus desired. I have indicated at a distant point from the supply station a lighting circuit comprising lamps 3 supplied with current from one phase of the distribution system through a trans-

former 4. In order to illustrate the operation of my invention I have indicated a means whereby this lighting circuit may be opened and closed from the supply station without interfering with the operation of any other consumption devices which may be connected to the distribution system.

The control means for the lighting circuit which I have indicated comprises at the supply station an electron discharge device 5 which may be employed to produce currents of any desired frequency. Current for the operation of the device 5 is obtained from the distribution conductors through a transformer 6, the secondary winding of which is connected to the primary windings 7 of a second transformer through a push button switch 8. Current for heating the filamentary cathode 9 of the electron discharge device 5 is obtained from a secondary winding 10 which is associated with the primary winding 7. Current for the plate circuit of the device 5 is obtained from a secondary winding 11 which is associated with primary winding 7. The primary 12 of an oscillation transformer is connected to the plate electrode 13 of device 5 through a condenser 14 and to the grid through a grid condenser 15 and grid leak 16. The mid point 17 of the secondary 10 is grounded at 18 and one point in the primary 12 of the oscillation transformer is also grounded at 18 through an adjustable tap 19. A second point in the primary 12 is also connected to ground at 18 through an adjustable tap 20 and a bypass condenser 21.

The secondary 22 of the oscillation transformer is connected to one phase of the distribution system through a switch 23 and a condenser 24 of such capacity as to prevent any appreciable flow of current from the distribution system through the secondary winding 22 of the oscillation transformer. By proper tuning of the oscillating system through adjustment of the taps 19 and 20 or adjustment of the condenser 21 it is possible to impress upon the distribution system currents of any frequency desired whenever the push button switch 8 is operated.

At or near the point where the switch 25 is located which controls the circuit of lamps 3, I provide two relays 26 and 27 which are arranged to respond only to currents of a

particular frequency. Contact members 28 and 29 of relay 27 are normally closed and are included in a control circuit for switch 25. Contacts 30 and 31 of relay 26, are also included in the control circuit of switch 25. I have indicated these contacts as open so that the control circuit of switch 25 is open, the switch is also open and the lamps 3 are not lighted.

When it is desired to close switch 25 so as to close the circuit of lamps 3, a current is impressed upon the mains 1 of a predetermined frequency for which the circuit made up of condenser 32 and variometer 33 is resonant. As a result current is supplied from variometer 33 to the secondary coil 34 and the circuit in which coil 34 is included. The circuit is made up of a series condenser 35 and series inductance 36 and inductance 37, which is in shunt to condenser 38. Inductances 36 and 37 serve as actuating coils for relay 26 and capacity 35 and inductances 34 and 36 form a series resonant circuit for the frequency impressed on the circuit while capacity 38 and inductance 37 form a parallel resonant circuit for the frequency impressed thereon. As a result the currents flowing in coils 36 and 37 will differ in phase and hence be capable of efficiently actuating relay 26 and closing contacts 30 and 31. The control circuit of switch 25 also includes a holding coil 39 for relay 26, which holds contacts 30 and 31 together after relay 26 has been actuated.

When it is desired to extinguish lamps 3 a current is impressed upon the mains 1 of a frequency for which the circuit made up of capacity 40 and variometer 41 is resonant. This supplies current to the actuating circuit of relay 27, which is made up in the same manner as that of relay 26. By the actuation of relay 27 contacts 28 and 29 are separated thus opening the control circuit of switch 25 and the switch is opened. At the same time holding coil 39 is deenergized, permitting contacts 30 and 31 to open. As a result relay 26 is again in condition to close the control circuit of switch 25.

What I claim as new and desire to secure by Letters Patent of the United States, is:

1. The combination in a control system of an electrical supply circuit adapted to be supplied with currents of different desired frequencies, resonant circuits connected to said supply circuit for receiving therefrom currents of desired frequencies and additional resonant circuits associated with said first mentioned resonant circuits for operating electrical apparatus each of said second mentioned resonant circuits comprising a coil which is tuned with a series capacity and a coil which is tuned with a shunt capacity.

2. The combination in a control system of a relay having a plurality of actuating

coils, a common series resonant circuit for supplying to all of said relay coils currents of a predetermined frequency for the actuation of said relay and means for supplying to different actuating coils of said relay from said resonant circuit currents of different phase.

3. The combination in a control system of an electrical supply circuit adapted to be supplied with currents of different desired frequencies, resonant circuits connected to said supply circuit for receiving therefrom currents of desired frequencies, relays having a plurality of actuating coils adapted to be supplied with current from said resonant circuits, and additional means for simultaneously supplying to different actuating coils of each relay from a corresponding resonant circuit currents of different phase.

4. In combination, a circuit to be controlled, said circuit including a switch biased to open position and a switch biased to closed position, means responsive to current of a certain frequency for closing said first mentioned switch, means for maintaining said switch in closed position, means responsive to current of another frequency for opening the second mentioned switch and resonant circuits adapted to supply said frequency responsive means with currents of desired frequencies.

5. The combination, in a control system, of a plurality of circuits resonant to current of different frequencies, additional resonant circuits associated with the first mentioned circuits for operating electrical apparatus, each of said second mentioned resonant circuits comprising a coil which is tuned with a series capacity and a coil which is tuned with a shunt capacity and electrical apparatus operated by said coils.

6. The combination, in a control system, of a plurality of circuits resonant to current of certain frequencies, relays having a plurality of actuating coils adapted to be supplied with current from said resonant circuits, and additional means whereby currents of different phase may be simultaneously supplied to the different actuating coils of each relay from a corresponding resonant circuit.

7. The combination in a control system of an electrical network adapted to be supplied with currents of different desired frequencies, resonant circuits connected to said network for receiving therefrom currents of desired frequencies, relays having a plurality of actuating coils, additional resonant circuits associated with said first resonant circuits and including said actuating coils and means associated with said additional resonant circuit for supplying to different actuating coils of each relay currents of different phase.

8. The combination in a control system of

a relay having two actuating coils connected in a common circuit including a series condenser and resonant at a certain frequency, a second condenser connected in parallel with one of said coils and so proportioned with respect to said coil as to produce resonance therewith at said certain frequency, and means for supplying to said common circuit currents of said certain frequency to produce actuation of said relay. 10

In witness whereof I have hereunto set my hand, this 31st day of January, 1923.

EDWARD AUSTIN.