

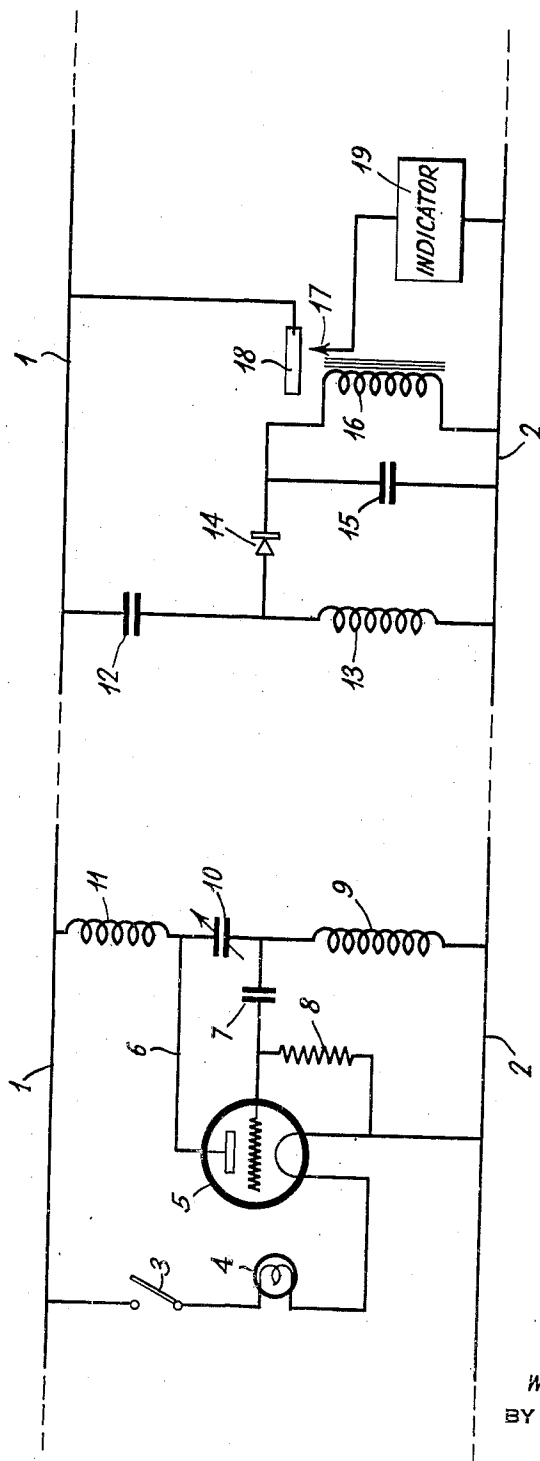
March 18, 1941.

W. VAN B. ROBERTS

2,235,169

REMOTE CONTROL SYSTEM

Filed May 7, 1937



INVENTOR
WALTER VAN B. ROBERTS
BY *H. S. Swann*
ATTORNEY

UNITED STATES PATENT OFFICE

2,235,169

REMOTE CONTROL SYSTEM

Walter van B. Roberts, Princeton, N. J., assignor
to Radio Corporation of America, a corporation
of Delaware

Application May 7, 1937, Serial No. 141,253

2 Claims. (Cl. 250—36)

The present invention relates broadly to systems for carrier communication through power circuits and more specifically to calling arrangements therefor.

5 Devices are known in the art for utilizing existing power wiring systems such as the lighting circuits for apartments or private homes, stores, office buildings, coal mines, etc., for communication, but these devices at present lack extended utility because it is necessary to keep the vacuum tubes in the receiving portions thereof energized at all times so as to be constantly in readiness for any incoming signals.

10 An object of the present invention is to provide an auxiliary set of devices for calling the desired station without requiring a continuous expenditure of power when the communicating system is not in use.

15 In general, the present invention provides a means for superposing on the line currents of frequencies other than that of the power supply itself and at the receiving end a mechanism actuated by such superposed currents. While there are many ways for developing the aforesaid superposed currents, such as the use of a non-linear load across the line, for example, the preferred method is to arrange a vacuum tube oscillator whose filament or cathode is energized only for the purpose of and during the call, this oscillator being so connected or coupled to the line as to impress currents of oscillation frequency thereupon. At the receiving station there is provided a means for detecting such oscillations and operating a local device suitable for calling purposes such as a bell or buzzer. The use of this calling and indicating system is not limited, of course, to cooperation with a communicating system as the detecting device may be utilized to energize any desired type of local device from the remote or calling point.

40 Other objects of the invention will be readily observed from the following detailed specification when read in connection with the drawing which shows one possible form of the invention used to describe it.

45 In the drawing, a vacuum tube oscillator 5 is provided with a switch 3 which when closed connects the cathode of the tube across the power lines 1, 2. Thus the cathode becomes heated and the tube oscillates on each half cycle of the power line voltage, that is, when the anode is positive relative to its cathode. When the switch 3 is open no power is drawn from the line as the tube is not conductive. A suitable resistance 55 which may be in the form of an electric light

bulb 4 is included in series with the filament to limit the filament current to its nominal value. When the switch is closed, oscillations are superposed on the power line 1, 2, and travel to considerable distances over the system. It will be seen that the oscillatory circuit includes the power line so that oscillations are forced to travel along the power line in order to complete the oscillatory circuit. The natural capacity between the wires of the line as well as other devices such as electric lights or the like bridged across the line form the return path for the oscillatory current.

At the receiving point there is provided a series resonant circuit tuned to the oscillation frequency. Oscillations traveling along the line pass through this resonant circuit and a high step-up in voltage is provided by resonance. A rectifier of any suitable type is connected between two points having a considerable difference of oscillatory potential and serves to produce direct current from the oscillatory energy. This direct current is preferably passed through the winding 16 of a sensitive relay which closes a contact 17, 18 during the time that oscillations are coming in. A large condenser 15 across the relay winding maintains a steady flow of current through the relay during the half cycles of the power frequency when the oscillator 5 is inoperative. The contact closed by the relay may be used to energize an indicator 19 which may take the form of a buzzer, or in the case of hospitals, an electric light, or any other desired device.

It is essential in the operation of the present invention that the rectifying device at the called station should consume little or no power when not in operation and for this reason it is preferable to provide a rectifier which does not require a heated cathode. Such rectifiers are well known in the art, an example being the well known copper oxide rectifier.

Only one calling station and one called station are shown in the drawing but it will be appreciated that a plurality of each of these types of stations may be used on the same line. In case it is desired to call a particular station without calling other stations, the various called stations may be tuned to receive different oscillation frequencies so that by setting the tuning condenser 10 shown in the oscillation generator circuit to produce any one of a number of frequencies, a particular station may be called. In case an audible signal is all that is required at the called station, it is not necessary to provide a relay to close a lock circuit as a small loudspeaking device may be substituted for the relay winding and will

produce a tone characteristic of the interruption of the oscillations by the alternating plate voltage at the oscillation generator. In this case the shunting condenser 15 shown across the relay winding is, of course, omitted.

I claim:

1. In a remote control system including an electric light and power supply line, means for generating high frequency current including an electronic tube oscillator having coupled input and output circuits, a circuit including inductance and capacity in series shunted directly across the power supply line, at least a part of said last named circuit being included in one of said oscillator tube circuits, said last named circuit together with the power supply line forming a resonant circuit having a single degree of freedom for determining the frequency of the generated high frequency current.

2. In a remote control system, an alternating current electric light and power supply line having two conductors, an electronic tube oscillator having an anode, a cathode and a grid electrode, a circuit including a switching device, a resistance element and said cathode all in series connected across said power supply line, a circuit including a pair of inductance coils and a condenser intermediate said coils all in series connected across the power supply line, means for connecting the anode of said tube to a point of said last named circuit intermediate one of said inductance coils and the condenser, means including a coupling condenser for connecting the grid electrode to the other side of said first named condenser and a leak resistance connected between the grid electrode and the cathode.

WALTER VAN B. ROBERTS.