Aug. 28, 1962 J. C. LESHER 3,051,934

BUILDING PROTECTION SYSTEM

Filed Dec. 1, 1958 2 Sheets-Sheet 1

FIG. 1

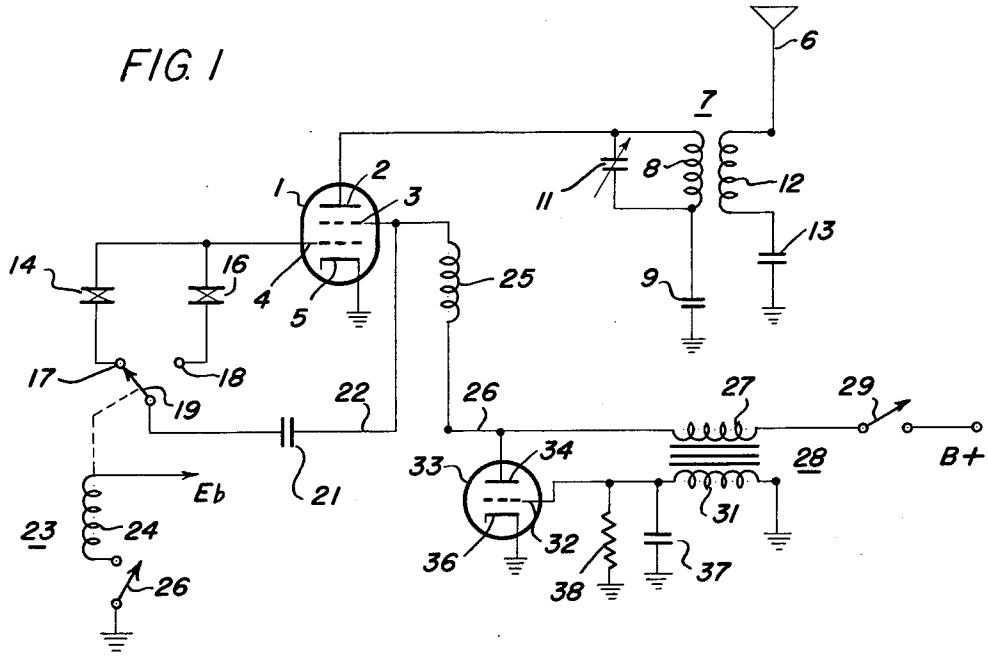
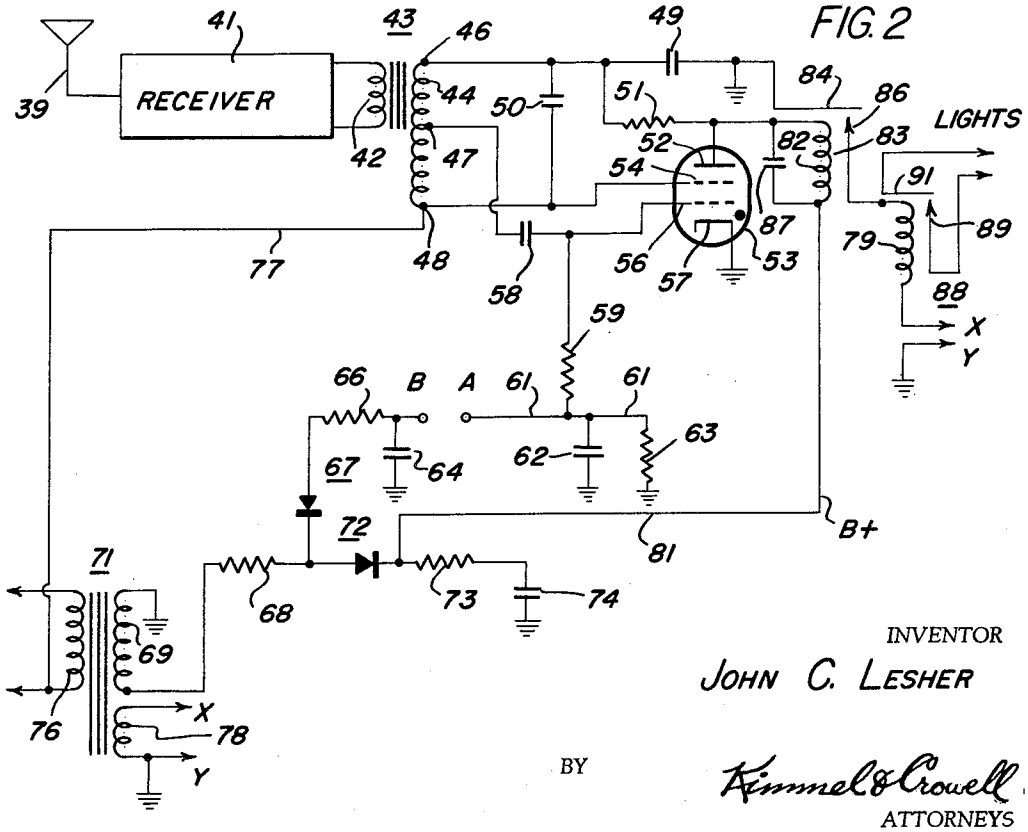


FIG. 2



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FIG. 3

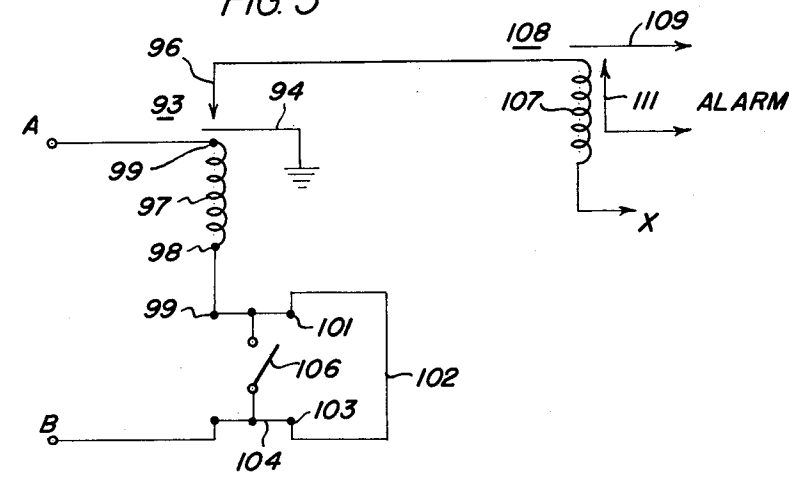


FIG. 4

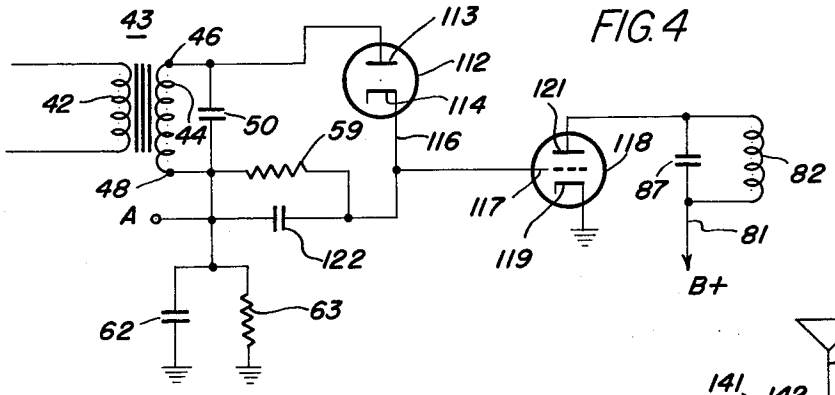
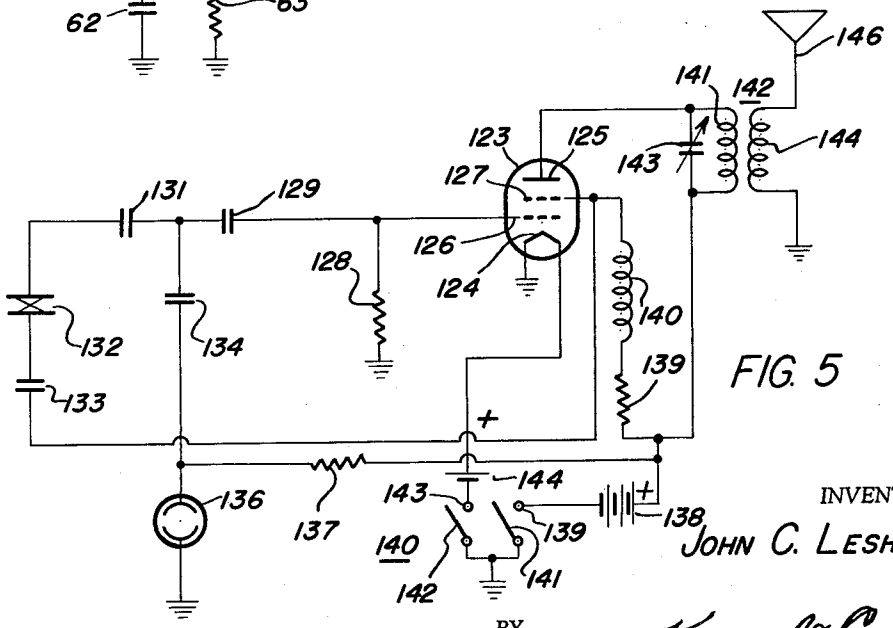


FIG. 5



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3,051,934
BUILDING PROTECTION SYSTEM

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Filed Dec. 1, 1958, Ser. No. 777,340
7 Claims. (Cl. 340—224)

The present invention relates to building protection systems and more particularly to a remote control system employed to control the lights within a building from externally thereof. Still more particularly the invention provides a remotely controlled lighting system for buildings and other properties and a burglar alarm system which is integral therewith and also controls the lighting system of the building in response to illegal entry.

For many years it has been conventional for police to check periodically the premises of business establishments for prowlers and this had usually been accomplished by either a foot patrolman who shines a flashlight into the building or by policemen in prowl cars who direct the spotlights on the prowl cars into the premises. The difficulty with this sort of procedure is that it is slow since the spot of light must be swept through the premises, that prowlers can very easily move out of the range of the spotlight or simply keep away from the beam, and that the policemen either on foot or in the prowl car who are performing the checking immediately warn the prowler of their presence and put him on his guard. Further, the spotlight on the prowl car or the flashlight in the hand of the policeman immediately tell the intruder where the policeman is and render him a ready target for the desperate criminal. Further difficulty with such systems is that even if a patrolman or policeman in a prowl car does spot an intruder in the building, as a result of the darkness of the premises, the intruder has a distinct advantage over the policeman while attempting to elude him since he can remain in shadowed areas and therefore remain substantially invisible.

The same difficulty that is experienced by policemen is encountered by night watchmen who are employed to protect particular premises since normally he has to patrol a substantially dark building and therefore is open to sudden and unforeseeable attack. Further, the procedure now employed renders the night watchman's services only partially effective since again any prowler can elude a spotlight or, if lights are turned on in one room, he can usually move to another room which is still dark.

It is an important object of the present invention to provide an inspection system for utilization by policemen and night watchmen which permits all of the lights of a building or a substantial part thereof to be turned on by remote control from either internally or externally of the building so that the entire building or premise is illuminated at the same instant.

It is still another object of the present invention to provide a remote transmitter unit which may be mounted in a police car or a portable trnasmitter unit which may be carried by a policeman and a receiver unit on the premises to be protected, which receiver is tuned to receive modulated carrier signals from the transmitter in order to control the lights within a building.

In accordance with the present invention a prowl car or patrolman is provided with a transmitter which transmits on a predetermined frequency and is modulated by a predetermined audio signal. The modulated carrier, which is transmittable at will from the transmitter, is received by a receiver disposed within a building to be protected. The receiver detects the modulating signal and then converts it into a direct current voltage which is employed to control a relay. The relay is employed

to control the lighting circuit of the building so as to turn on all or a substantial proportion of the lights of the building. Thus, a policeman walking down the street or passing the premises in a prowl car need merely throw a switch on his portable unit in order to completely illuminate a building.

A further feature of the invention is the provision of a burglar alarm system which is inter-related with the aforesaid receiver in order to turn on the lights within the premises whenever a burglar alarm system is actuated. The fact that the lighting system may be actuated by the burglar alarm increases the efficiency of the system since the police, upon arriving at the scene may immediately completely illuminate the building to facilitate a search for the criminal.

The unit mounted within the prowl car is provided with a carrier frequency selection system wherein one of the carrier frequencies is employed to control a remote receiver disposed within the building and the other carrier frequency may be employed to control traffic lights along the route that a prowl car may follow in approaching a building from which a burglar alarm signal has been received. Thus, the single transmitter provided for the prowl car may serve a dual function with regard to traffic light control as well as building light control.

The apparatus of the invention is not restricted to police use since firemen are often desirous of illuminating a building in order to determine the location and extent of a fire and the smoke hazard within the building. By being able to turn on all the lights in the building from the outside, firemen need not risk their lives in attempting to locate various light switches in order to evaluate the situation. The burglar alarm system may be replaced or utilized in conjunction with a fire alarm system which would affect the lighting system in the same manner as the burglar alarm system.

It is therefore another object of the present invention to provide a receiver for controlling the lights within a building which may be controlled by a transmitter located externally of the building or by means of burglar alarm systems located internally of the building.

It is a further object of the present invention to provide a transmitter for remotely controlling a light controlling receiver in a building which transmitter also may be employed to control traffic lights along the route followed by an emergency vehicle.

It is another object of the present invention to provide a receiver unit which may control the lights of a building in response to remotely generated signals or which may respond to actuation of a burglar alarm in which latter instance a conductive loop of a burglar alarm is connected in the receiver circuit such that when the conductive loop is broken due to illegal entry the light control section of the aforesaid receiver is also energized to turn on the lights of the building.

The above and still further objects, features and advantages of the present invention will become apparent upon consideration of the following detailed description of one specific embodiment thereof, especially when taken in conjunction with the accompanying drawings, wherein:

FIGURE 1 of the accompanying drawings is a schematic wiring diagram of a first embodiment of a transmitter which may be employed with the system of the invention and which is intended to be mounted in a police prowl car or fire engine or similar vehicle;

FIGURE 2 is a schematic wiring diagram of a first embodiment of a receiver which may be utilized as a unit of the system of the invention;

FIGURE 3 is a schematic wiring diagram of a burglar alarm system which may be incorporated in the system of FIGURE 2;

FIGURE 4 is a schematic wiring diagram of a second

embodiment of the receiver which may be employed with the system of the invention; and

FIGURE 5 is a schematic wiring diagram of a portable transmitter unit which may be utilized with the system of the invention.

Referring now to FIGURE 1 of the accompanying drawings there is illustrated a transmitter unit which is adapted to be mounted in a motor vehicle such as a police car, the automobile or similar vehicle of a private detective agency or a fire engine or fire chief's car.

The transmitter comprises a tetrode **1** having an anode **2**, a screen grid **3**, a control grid **4**, and a cathode **5** connected to a source of reference potential which is hereinafter referred to as ground. The tetrode **1** comprises an oscillator and a modulator tube and feeds an antenna **6** of the system through an antenna transformer **7**. The anode **2** of the tube **1** is connected to one end of a primary winding **8** of the antenna transformer **7** and the other end of the primary winding **8** is connected via a capacitor **9** to ground potential. The primary winding **8** is shunted by a variable capacitor **11** which is adapted to tune the resonant circuit comprising winding **8** and capacitor **11**, to a predetermined frequency as will be explained subsequently. The antenna transformer **7** includes a secondary winding **12** having one end connected via a capacitor **13** to ground and having another end connected to the antenna **6**. The secondary winding **12** of the transformer **7** and capacitor **13** constitute a broadly tuned series resonant circuit tuned approximately to the frequency of the parallel resonant circuit comprising winding **8** and capacitor **11**.

The control grid **4** of the tube **1** is connected to one end of each of two piezo-electric crystals **15** and **16**, the other ends of which are connected to fixed switch contacts **17** and **18** respectively. A movable switch contact **19** is adapted to engage selectively the contacts **17** and **18** and is connected via a coupling capacitor **21** to the screen grid **3**. The switch comprising contacts **17**, **18**, and **19** is adapted to be actuated by an electro-magnet **23** having a coil **24** connected via a manual switch **26** to ground potential and having its other end connected to the battery of the vehicle in which the transmitter is positioned. The connection of the coil **24** to the vehicle battery may be through the ignition switch so that the system is inoperative when the ignition switch is turned off.

The grid **3** of tube **1** is connected through a high frequency choke **25** to a lead **26** and the lead **26** is connected through a primary winding **27** of a transformer **28** to a manual switch **29** which is employed to energize selectively the transmitter of FIGURE 1. The switch **29** is connected to a source of B+ which may constitute a vibrator power supply of the appropriate voltage. The transformer **28** further comprises a secondary winding **31** having one terminal grounded and the other terminal connected to a grid **32** of a triode **33** having an anode **34** connected to the lead **26** and a cathode **36** connected to ground. The grid **32** of the tube **33** is connected to ground through a capacitor **37** and a resistor **38**. The tube **1** constitutes an element of a carrier frequency oscillator having its frequency controlled by the crystal **14** or crystal **16** depending upon which position the movable contact **19** assumes. The screen grid **3** constitutes the anode of the carrier oscillator with a portion of the signal energy developed across the choke **25** being fed back through coupling capacitor **21** to the circuit of the control grid **4**. The signals fed back to the grid depend upon which of the crystals **14** or **16** is connected in the circuit and therefore the frequency of oscillation of the carrier oscillator is determined by the crystals.

In accordance with the invention, when the switch **26** is opened and the electro-magnet **23** is de-energized, the movable contact **19** engages the stationary contact **17** and the system is adapted to oscillate at a frequency for controlling lights internally of a building. When it is desired

to control traffic lights or other portions of a system, the switch **26** is closed in order to energize the electro-magnet **23** and cause the movable contact **19** to engage the stationary contact **18** to insert the crystal **16** in the grid circuit of the oscillator. The oscillations developed by the carrier oscillator are modulated by a predetermined audio frequency which for purposes of illustration may be taken to be 115 cycles per second. The 115 cycle modulating signal is generated by an oscillator including the thiode **33** and the transformer **28** and the capacitor **37**. The oscillator comprises a blocking oscillator which initially is conductive and feeds back energy through the transformer **28** in such a sense as to charge the capacitor **37** negatively until the grid **32** is driven to cut-off potential. Subsequently the capacitor **37** discharges through a resistor **38** and the tube is again rendered conductive with energy being fed back through the transformer **28** to increase conduction until the capacitor **37** is again charged sufficiently negatively to prevent conduction through the tube. The 115 cycle per second signal appearing on the lead **26** is coupled through the coil **25** to the screen grid **3** of the tube **1**. The carrier frequency signal generated by the oscillator comprising the elements **3**, **4**, and **5** of the tube **1** is modulated by the signal appearing on the grid **3** and therefore a modulated signal is applied to the tuned circuit comprising the primary winding **8** of the transformer **7** and the variable capacitor **11**. The choke **25** prevents the R.F. signals from appearing on lead **26** but allows the audio signals generated in tube **33** to be coupled to the grid **3**. The antenna circuit is tuned by the capacitor **11** to a frequency mid-way between the natural frequencies of the crystals **14** and **16** so that either carrier frequency is passed with equal attenuations through the antenna circuit. Signals appearing across the primary winding **8** of the antenna transformer **7** are developed in the series resonant circuit comprising secondary winding **12** of a transformer **7** and the capacitor **13** therefore are applied to the antenna **6** and are radiated thereby.

Referring now to FIGURE 2 of the accompanying drawings there is illustrated a receiver and associated control circuit for controlling the lights within a building in response to reception of a modulated carrier signal generated by the transmitter of FIGURE 1. The circuit illustrated in FIGURE 2 comprises an antenna **39** feeding an appropriate receiver **41** which may be a superheterodyne receiver, a super-regenerative receiver or other appropriate receiver. The receiver **41** develops an audio output signal at the modulating frequency namely, 115 cycles per second across a primary winding **42** of an audio transformer **43** having a center tapped secondary winding **44**. The secondary winding **44** feeds a rectifier circuit which produces a D.C. signal, in response to 115 cycles, for controlling the energization of a control relay. The secondary winding **44** includes an upper terminal **46**, a center tap terminal **47**, and a lower terminal **48** and is tuned to 115 cycles per second by a capacitor **50** connected in parallel therewith. The terminal **46** is connected via a coupling capacitor **49** to ground potential and is further connected via a resistor **51** to an anode **52** of a thyratron **53**. The thyratron **53**, which constitutes the rectifying element of the circuit, further comprises a screen grid **54** connected to the tap **48** on the secondary winding **44**, a control grid **56**, and a cathode **57** connected to ground. The control grid **56** is connected via a coupling capacitor **58** to the center tap **47** of the transformer winding **44** and also through a resistor **59** to a lead **61**. The lead **61** is connected to ground through a filter capacitor **62** and a shunting resistor **63**. The lead **61** is also connected to a terminal A of a pair of terminals A and B, terminal B being connected to ground through a second filter capacitor **64**. An impedance as will be more fully explained subsequently is connected between the terminals A and B and in conjunction with the filter capacitors **62** and **64** constitutes a filter

section for a rectifier power supply. Specifically, the terminal B is connected through a dropping resistor **66** to the anode of a diode **67** having its cathode connected through a dropping resistor **68** to one end of a secondary winding **69** of power transformer **71**. The other end of the winding **69** is connected to ground. The cathode of the diode **67** is also connected to the anode of the diode **68** having its cathode connected to ground through a filter circuit comprising a resistor **73** and a filter capacitor **74** connected in series. The transformer **71** further includes a primary winding **76** which is connected across a source of alternating current and which has one end connected via a lead **77** to the terminal **48** of the secondary winding **44** of the audio transformer **43**. The transformer **71** also includes a secondary winding **78** which is employed to heat the filament of the tube **53** and further provides power to a light control relay **79** as will be explained more fully subsequently.

Continuing with a description of the circuit, the cathode of the diode **72** is connected via a lead **81** which constitutes the B+ lead of the circuit to one end of a coil **82** of an electromagnet **83** the other end of which is connected to the anode **52** of thyratron **53**. The electro-magnet **83** further comprises an armature **84** which when attracted by the coil **82** is adapted to engage a fixed contact **86**. The coil **82** is shunted by a holding capacitor **87** for purposes to be explained subsequently. The stationary contact **86** of the electromagnet **83** is connected to one end of the coil **79** of the light control relay generally designated by the reference numeral **88**, the other end of the coil **79** being connected to the X terminal of the secondary winding **78** of the power transformer **71**. The relay **88** further comprises a stationary contact **89** and a movable contact **91** which is adapted to be actuated by the armature of the relay **88** and upon energization of the coil **79** to be moved into engagement with the stationary contact **89**. The contacts **89** and **91** are connected in the lighting circuit of the building such that upon the contact **91** engaging the contact **89**, the lights within a building are turned on.

In operation the diode **67** and the filter circuit comprising capacitor **64** and the impedance between terminals A and B provide a bias voltage for the control grid **56** of the thyratron **63** so that the tube is normally rendered non-conductive. However, upon the receiver **41** receiving a carrrier frequency modulated by the appropriate audio frequency; namely, 115 cycles, an audio signal appears across the secondary winding **44** of the audio transformer **43**. Upon the audio signal instantaneously attaining a polarity such that the terminal **48** of the secondary winding **44** is positive with respect to the terminals **46** and **47**, the signal on the grid **54** is sufficient to overcome the effect of the negative bias on the control grid **56** and therefore the thyratron **53** fires causing the relay **83** to be energized. Upon energization of the relay **83**, the movable contact **84** engages the stationary contact **86** and completes a circuit from the terminal X of winding **78** through the coil to ground and therefore the coil **79** is energized. Upon energization of the coil **79** the contact **91** is caused to engage the contact **89** and the light circuit is completed thereby energizing whatever lights are connected in the circuit.

In order that the circuit may be turned on and off from externally of the building, the terminal **48** of the secondary winding **44** of the transformer **43** is connected via the lead **77** to one side of the A.C. input line; that is, to one side of the primary winding **76** of the power transformer **71**. In consequence of this connection when the terminal of the winding **76** to which the lead **77** is connected swings negative with respect to ground, the anode **52** of the thyratron **53** is driven negative with respect to ground and the tube is rendered non-conductive. Therefore, the circuit automatically de-energizes the tube once during each cycle of the power line voltage. The input signal in the example chosen for purposes of illustration is 115 cycles per second which is approximately twice the A.C. line frequency and therefore the thyratron **53** is cut off after every two cycles of the audio signal. However, the holding capacitor **87** which is connected in parallel of the winding **82** of the relay **83** discharges through the coil **82** during the interval when the thyratron **53** is non-conductive so as to maintain the coil energized. Upon discontinuance of reception of the modulating signal; however, the capacitor **87** becomes sufficiently discharged after a few cycles of the power line signal to permit de-energization of the winding **82** and permits release of the movable contact **84** of the relay **83**. Upon the contact **84** becoming disengaged from the contact **86**, the relay **79** is de-energized and the light circuit is opened.

If a burglar alarm system is not to be employed with the apparatus illustrated in FIGURE 2, a simple resistor or choke may be inserted between the terminals A and B of the control circuit to provide the requisite continuity in the bias circuit of tube **53**. However, if a burglar alarm system is to be employed with the inspection system of the invention, a burglar alarm circuit, as illustrated in FIGURE 3 of the accompanying drawings, is connected between the terminals A and B of the FIGURE 2.

Referring now specifically to FIGURE 3 of the accompanying drawings a relay **93** is provided with a movable contact **94**, a stationary contact **96**, and a relay coil **97**. When the coil **97** is energized the contact **94** is held out of engagement with the contact **96**. The coil **97** is provided with a terminal **98** and a terminal **99** with the terminal **99** connected to the terminal A of FIGURE 2. The terminal **98** of the coil **97** is connected via a lead **99** to a terminal **101** of a burglar alarm loop **102**. The loop **102** is normally employed in burglar alarm systems in order to detect illegal entry by breaking through or opening a window or door or similar building opening. The loop comprises a wire or other conductive material extending between the fixed and movable member of each opening and extending across the closure member of the building opening so that if illegal entry is effected by illegally opening or breaking in through the closure member, the conductor is broken and opens the circuit. The loop **102** terminates in a second terminal **103** which is adapted to be connected via a lead **104** to the terminal B of the circuit illustrated in FIGURE 2. The loop **102** is adapted to be shunted by a key switch **106** so that when the proprietor or other individual of an establishment opens the door in the morning he first closes the key switch **106** so that the loop **102** is shunted and when windows or doors or other aperture closures are opened and break the continuity of the loop **102** the alarm will not go off.

It will be noted that when the circuit illustrated in FIGURE 3 is connected between the terminals A and B of FIGURE 1 so long as the loop **102** is continuous or the switch **106** is closed, a continuous circuit is established between terminals A and B of the circuit of FIGURE 2. The resistance **63** of the bias circuit of FIGURE 2 is chosen in conjunction with the resistances **66** and **68** of the circuit such that the current through the coil **97** of the relay **93** of FIGURE 3 is sufficient to energize the relay. So long as the coil **97** is energized, the movable contact **94** of the relay **93** is maintained out of engagement with the fixed contact **96** of the relay. The movable contact **94** is connected to ground while the fixed contact **96** is connected via a coil **107** of a further relay **108**. The end of the coil **107** remote from the contact **96** is connected to the terminal X of the secondary winding **78** of the power transformer **71**. Therefore, when the contacts **94** and **96** are engaged, the relay **107** is energized and pulls its movable contact **109** into engagement with its fixed contact **111** thereby completing an alarm circuit. With normal bias current flowing through the coil **97** and the contact **94** out of engagement with the contact **96** the relay **107** is de-energized and the alarm circuit is opened.

Upon illegal entry of the premises which results in

opening the burglar detector loop **102** two things happen. First of all, the bias circuit of the apparatus of FIGURE 2 is opened, thereby removing the negative bias from the thyratron **53**. In consequence, upon a positive swing of the voltage on the lead **77** the anode of the tube **52** is driven positive with respect to the cathode. Since a bias voltage is no longer applied to the control grid **56** of the tube **53**, the capacitor **62** being discharged through resistor **63**, the thyratron is rendered conductive thereby energizing the light circuit of the building and immediately illuminating the entire or selected portions of the premises. Concurrently, the energization of the relay **93** effects energization of the coil **107** which closes the burglar alarm circuit to summon the police.

It is therefore apparent that the instrument illustrated in FIGURE 3 when employed in conjunction with the instrument of FIGURE 2 converts the light control system to a combined burglar alarm and light control system. The only additional equipment required to so convert the system of FIGURE 2 is two relays, a key switch and a burglar detection loop such as the loop **102** plus the actual alarm circuit to a central police station or other listening posts.

The circuit illustrated in FIGURE 2 may be somewhat modified particularly with regard to the circuit for detecting the 115 volts. In FIGURE 4 those elements which correspond to elements illustrated in FIGURE 2 carry the same reference numerals as in the latter figure. Referring now specifically to FIGURE 4 audio signals are developed across the primary winding **42** of the audio transformer **43** and subsequently appear across the secondary winding **44** of this transformer. The secondary winding **44** is tuned by the capacitor **50** to the frequency of the modulating signal; namely, 115 cycles per second. The A.C. signals developed across the secondary winding **44** are rectified by a rectifier **112**, having an anode **113** connected to the terminal **46** of the winding **44** and having a cathode **114** connected via a lead **116** to the end of the resistor **59** remote from the terminal A of the circuit. The lead **116** is connected to a control grid **117** of a triode **118** having a cathode **119** connected to ground and having an anode **121** connected via the relay coil **82** to a source of anode voltage; namely, the lead **81**. Again, the coil **82** is shunted by a holding capacitor **87**.

In the operation of this circuit, the bias voltage developed at the terminal A maintains the tube **118** nonconductive in the absence of a signal appearing across the primary winding **42** of the audio transformer **43**. Upon the appearance of a modulating voltage, it is rectified by the diode **112** and appears on the lead **116**. The rectified signal on lead **116** is sufficient to overcome the bias developed on the grid **117** by the voltage applied to the terminal A of the circuit and therefore, the tube **118** is rendered conductive and energizes the coil **82** which operates the lighting circuit. As in the modification illustrated in FIGURE 2 of the invention, the circuit of FIGURE 3 may be connected in the bias circuit so that the system may operate as a burglar alarm as well as a lighting control circuit. Under the latter circumstances, breaking of the loop **102** removes the bias on the tube and both the grid and cathode are at ground potential and the tube is conductive.

The transmitter illustrated in FIGURE 1 of the accompanying drawings is intended to be mounted in a motor vehicle for utilization by policemen, firemen, or private detective agencies, from externally of the building and often at a relatively great distance therefrom. In accordance with a further feature of the invention, there is provided a small portable transmitter which may be employed by a patrolman while making his rounds on his beat or by a night watchman as he makes his rounds through a plant.

Referring now specifically to FIGURE 5 of the accompanying drawings there is illustrated a schematic wiring diagram of a portable transmitter employing a tetrode **123** having a heated cathode **124**, a control grid **126**, and a screen grid **127**. The tube **123** operates as an oscillator tube, a modulator tube, and a transmitter tube. In order to carry out its multiple functions, the control grid **126** of the tube is connected to ground through a bias resistor **128** and is connected through series connected coupling capacitors **129** and **131** to one terminal of a carrier frequency control crystal **132**. The other terminal of the crystal **132** is connected via a coupling capacitor **133** to the screen grid **127** of the tube **123**. The junction of the capacitor **129** and **131** is connected through a series circuit comprising capacitor **134** and neon tube **136** to ground. The junction of the capacitor **134** and **136** is connected through a high resistance **137** to a positive terminal of a battery **138** which supplies the high voltage for the circuit. The positive terminal of the battery **138** is connected through a resistor **139** and R.F. choke **140**, connected in series, to the screen grid **127** of the tube **123**. The positive terminal of battery **138** is also connected through a primary winding **141** of an antenna transformer **142** to an anode **125** of the tube **123**. The negative terminal of the battery **138** is connected to a stationary contact **139** of a double pole single throw switch **140**. The switch **140** constitutes a first movable contact **141** adapted to engage the stationary contact **139** and a second movable contact **142** adapted to engage a second stationary contact **143**. Both of the movable contacts **141** and **142** are connected to ground while the second stationary contact **143** is connected through a filament or an A-cell **144** to the ungrounded end of the filament **124**. With the switch **140** in the position illustrated in FIGURE 5 the circuit is de-energized since B+ is not applied between the heated cathode **124** and the anode **125** of the tube **123** and the cathode heater voltage is not applied to the cathode. When the switch **140** is closed B+ is applied to the circuit and the A-cell **144** is connected in a complete series circuit with the filament, producing heating thereof. The primary winding **141** of the transformer **142** is shunted by the capacitor **143** which is tuned to the frequency of the crystal **132**. The transformer **142** further comprises a secondary winding **144** which is connected to an antenna **146** of the transmitter.

In operation radio frequency signals developed at the screen grid **127**, which is employed as an anode in the oscillator circuit, are coupled through the coupling capacitor **133** and the crystal **132** into the circuit of the control grid **126** of the tube **123**. The crystal passes only those signals occuring at its resonant frequency and therefore the oscillation of the oscillator is determined by the resonant frequency of the crystal. The neon tube **136** and the impedance **137** in conjunction with the battery **138** constitute a relaxation oscillator whose oscillations are coupled through the capacitor **134** to the grid **126** of the tube **123**. More particularly, the neon tube **136** appears as a capacitor until it breaks down and therefore the voltage across the tube **136** gradually builds up at a rate determined by the value of the resistor **137** and the value of capacity of the tube **136**. When the firing voltage of the tube is attained, the tube breaks down and the voltage thereacross falls until the extinction voltage is attained. Thereafter the capacity of the tube is again charged until a breakdown voltage is attained and in consequence the circuit comprises a relaxation oscillator. Both the carrier frequency oscillations and the relaxation oscillations appear at the grid **126** and the tube effects modulation of the carrier by the relaxation oscillator signals. Therefore the carrier and sidebands appear at the antenna **146** and are broadcast therefrom. The frequency of the oscillations produced by the relaxation oscillator are again chosen to be approximately 115 cycles per second so that the portable transmitter of FIGURE 5 may effect control of the same

circuits which are controlled by the transmitter of FIGURE 1. Obviouslly, other audio or superaudio frequency signals may be employed and the specific frequency mentioned above is exemplary only.

While I have described and illustrated one specific embodiment of my invention, it will be clear that variations of the details of construction which are specifically illustrated and described may be resorted to without departing from the true spirit and scope of the invention as defined in the appended claims.

What is claimed is:

1. A remote control apparatus for a lighting system comprising a transmitter for transmitting carrier signals, a receiver located in a prescribed area remote from said transmitter, said receiver having means for detecting said carrier signal, a burglar alarm system including a continuous conductive loop for protecting building openings, a lighting system for said prescribed area, a switch for controlling said lighting system, and means for actuating said switch, said means being independently responsive to transmission of carrier signals by said transmitter and in response to destruction of the continuity of said conductive loop independently of transmission of said carrier signals by said transmitter.

2. A remote control apparatus for a lighting system comprising a transmitter for transmitting carrier signals, a receiver located in a prescribed area remote from said transmitter, said receiver having means for detecting said carrier signal, a burglar alarm system including a continuous conductive loop for protecting building openings, a lighting system for said prescribed area, a switch for controlling said lighting system, and a single means for actuating said switch, said means being independently responsive to transmission of carrier signals by said transmitter and in response to destruction of the continuity of said conductive loop.

3. A lighting system control comprising a receiver responsive to modulated carrier signals for detecting the carrier modulating signal, a control element having first and second electrodes and at least one control electrode, a bias circuit for said control element, said bias circuit applying a bias voltage to one of said electrodes sufficient to render said control element non-conductive, said bias circuit rendering said control element conductive upon removal of said bias voltage, means responsive to said modulating signal for applying a voltage to said control electrode to overcome said bias voltage and render said control element conductive, a burglar alarm system, means responsive to energization of said burglar alarm system to remove said bias voltage from said control element, a lighting circuit and means responsive to conduction of said control element to energize said lighting circuit.

4. A lighting system control comprising a receiver responsive to modulated carrier signals for detecting the carrier modulating signal, a control element having first and second electrodes and at least one control electrode, a bias circuit for said control element, said bias circuit applying a bias voltage to one of said electrodes sufficient to render said control element non-conductive, said bias circuit rendering said control element conductive upon removal of said bias voltage, means responsive to said modulating signal for applying a voltage to said control electrode to overcome said bias voltage and render said control element conductive, a burglar alarm system, including a continuous conductive loop for protecting building openings, said conductive loop being connected in series with said bias circuit, a light circuit and means responsive to conduction of said control element to energize said lighting circuit.

5. A lighting system control comprising a receiver responsive to modulated carrier signals for detecting the carrier modulating signal, a thyratron having an anode, a cathode and two control electrodes, means for applying said detected modulating signal between one of said control electrodes and one of said anode and cathode, a bias circuit for developing a bias voltage on one of said control electrodes sufficient to render said thyratron non-conductive only in the absence of a modulating signal, a source of alternating voltage, means for coupling said source across said anode and cathode of said thyratron, the voltage of said source having amplitude greater than said modulating signal by the extinction voltage of said thyratron, said bias circuit rendering said control element conductive upon removal of said bias voltage independently of reception of said signals by said receiver, a burglas alarm system having a conductive loop for protecting access openings of an enclosure in which said receiver is situated, said loop being connecteed in series with said bias circuit, a lighting circuit and means responsive to conduction of said thyratron to energize said lighting circuit.

6. A lighting control system, comprising at least one lighting circuit, a switch means for selectively energizing and de-energizing said lighting circuit, said switch means de-energizing said lighting circuit in response to a predetermined voltage being applied thereto, a bias circuit for applying said predetermined voltage to said switch means, first means responsive to a predetermined occurrence for overcoming the voltage of said bias circuit sufficiently to energize said lighting circuit and second means responsive to a further occurrence for opening said bias circuit to energy said lighting circuit independently of said predetermined occurrence.

7. The combination according to claim 6 wherein said switch means comprises an electron tube, said predetermined voltage biasing said tube to non-conduction.

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