Nov. 9, 1954 J. HAGEN 2,694,148

FIRE ALARM SYSTEM

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FIG. 1

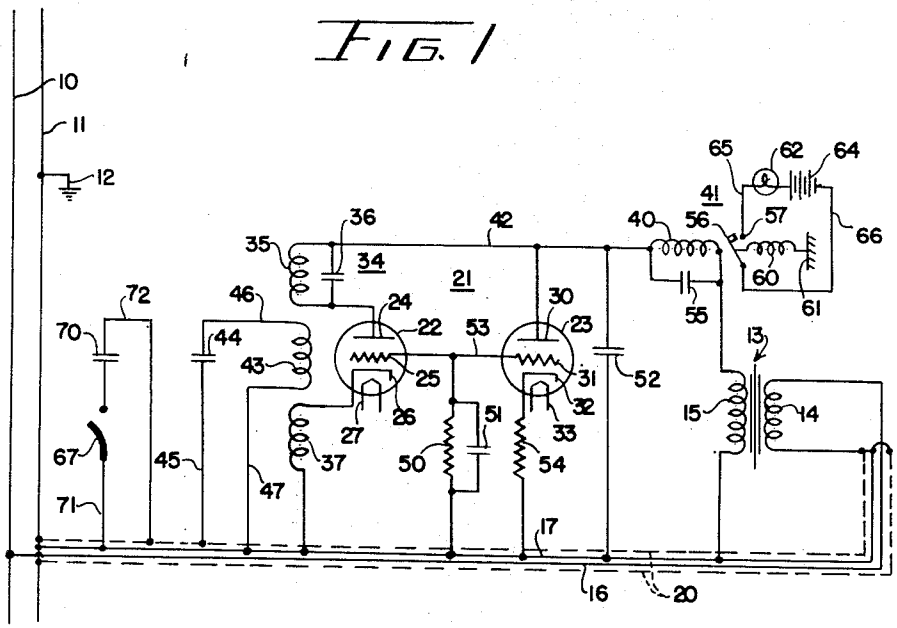
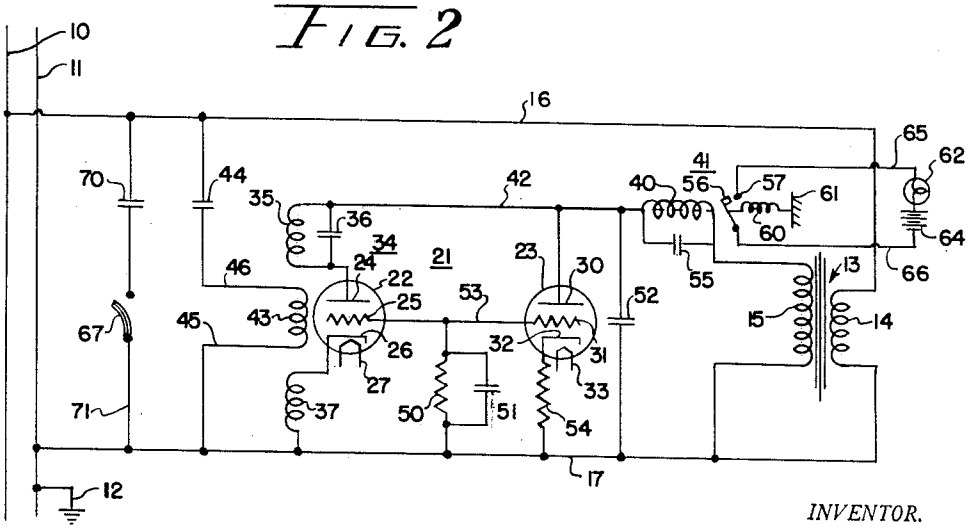


FIG. 2



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FIRE ALARM SYSTEM

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16 Claims. (Cl. 250—36)

This invention relates generally to fire alarm systems and is more particularly concerned with the type of fire alarm systems which use an oscillator circuit which is affected by the presence of undue heat.

Fire alarm systems have been known and used for many years. Some systems use fusible wires which are strung around a room with the wires melting to break an electric circuit when the temperature becomes too great. Other types of systems use a temperature sensitive switch which may be made to either open or close when the temperature becomes greater than that for which the switch is set. The present invention is concerned with the second type of the above-mentioned systems.

Many existing fire alarm systems are bulky, the wiring of the detectors is complicated, and special wiring is often required. The more complicated devices are subect to more malfunctioning and are less dependable. It is therefore desirable to have a simple device which has as few parts as possible which might cause a malfunction. The present invention uses a simple detector circuit and utilizes existing commercial power wiring to make the connection between the detector and an amplifying device. In the present invention both the detecting device and the amplifying device may be plugged into ordinary wall sockets.

It is therefore an object of the invention to design a simple new and improved, inexpensive fire alarm system.

Another object of the invention is to design a fire detection system using existing power wiring.

Another object of the invention is to design a fire alarm system using an oscillator circuit having inductance coils in the plate and grid circuits of an oscillator circuit which are loaded by a third inductance coil.

Another object of the invention is to design a fire alarm system using an oscillator circuit in which the oscillator circuit is normally so loaded as to prevent oscillation.

Another object of the invention is to design a fire alarm system which, in the event of failure, will fail "safe."

Another object of the invention is to design a fire alarm system using an oscillator circuit in which the load on the oscillator circuit is reduced sufficiently to throw the circuit into oscillation upon a sensed temperature reaching a predetermined value.

The invention generally comprises an oscillator circuit loaded by the impedance of two power lines with the loading normally being sufficient to prevent an alarm circuit from being operated. A temperature sensitive switch is placed across the two lines near the oscillator circuit and reduces the loading of the circuit, when the switch is closed, to cause the alarm circuit to be operated.

For a better understanding of the invention reference is made to the following, more detailed description taken in conjunction with the drawing in which:

Figure 1 shows a fire alarm system with the temperature sensitive switch connected across a grounded conductor and a ground conduit; and

Figure 2 shows a modification wherein the temperature sensitive switch is connected across the conductors from the power source.

Description of Figure 1

The system is generally energized from a power source, not shown, through a pair of conductors **10** and **11** with conductor **11** being grounded as at **12**. The system is more directly energized from a transformer **13** having a primary **14** and a secondary **15**. Primary **14** is connected to the conductors **10** and **11** through conductors **16** and **17**. The conductors are shown to be shielded by a conduit **20**.

The secondary **15** of transformer **13** is connected into an oscillator circuit **21** which is described and claimed in a Wannamaker application 694,401 filed August 31, 1946, now Patent 2,564,937, issued August 21, 1951, and assigned to the assignee of the present invention.

The oscillator circuit **21** includes an oscillator tube **22** and an amplifier tube **23**. The oscillator tube **22** has an anode **24**, a control electrode **25**, a cathode **26**, and a cathode heater **27**. Amplifier tube **23** has an anode **30**, a control electrode **31**, a cathode **32**, and a cathode heater **33**. Heaters **27** and **33** are energized from any satisfactory source, not shown.

A tank circuit **34** having an inductance coil **35** and a capacitor **36** is connected to the anode **24** of the oscillator tube **22**. An inductance coil **37** is connected to the cathode **26** of the oscillator tube **22**. A third inductance coil **43** inductively coupled inductance coils **35** and **37**.

Oscillator tube **22** is energized from transformer secondary **15** by the following circuit: from the upper end of transformer secondary **15** through a relay winding **40** of relay **41**, conductor **42**, tank circuit **34**, anode **24** and cathode **26** of oscillator tube **22**, inductance coil **37** and shielded conductor **17** to the lower terminal of transformer secondary **15**.

Inductance coil **43** is connected in series with a capacitor **44** across conductor **17** and ground conduit **20** by the following circuit: from conduit **20**, through conductor **45**, capacitor **44**, conductor **46**, inductance coil **43**, and conductor **47** to the conductor **17**.

Control electrode **25** of the oscillator tube is connected to the grounded conductor **17** through a bias resistor **50** having a bypass capacitor **51** connected in parallel therewith. The control electrode is also connected to the control electrode **31** of the amplifier tube **23** through a conductor **53**.

Amplifier tube **23** is energized by transformer secondary **15** by the following circuit: from the upper terminal of transformer secondary **15**, through relay winding **40**, conductor **42**, anode **30** and cathode **32** of amplifier tube **23**, bias resistor **54** and grounded conductor **17** to the lower terminal of transformer secondary **15**.

A capacitor **52** is connected between conductor **42** and grounded conductor **17** and is of a size which acts as a high frequency short circuit to ground.

Relay winding **40** has a capacitor **55** in parallel therewith to permit energization of the winding over the entire cycle when the relay energizing circuit is operative. The winding operates upon a movable contact **56** which makes and breaks connection with a fixed contact **57**. Movable contact **56** is biased by a spring **60** which is held fixed at one end as at **61**.

When contacts **56** and **57** are closed a circuit is completed through a warning light **62** which is connected to a battery **64** by the following circuit: from battery **64**, through light **62**, conductor **65**, fixed contact **57**, movable contact **56**, and conductor **66** back to the battery.

A temperature-sensitive switch **67** is connected in series with a capacitor **70** across ground conductor **17** and ground conduit **20** by the following circuit: from grounded conductor **17**, through conductor **71**, temperature-sensitive switch **67**, capacitor **70**, and conductor **72** to conduit **20**.

In actual practice the connection between the conduit and the grounded conductor is generally made near the place where the conductors enter the building while the coil **43** is connected across the conduit and conductor in the room where it is desired to detect for fire. However, the system operates satisfactorily if the ground conductor and conduit are connected at any point remote from the switch **67** and the connection of coil **43** across the grounded conductor and conduit. The normal impedance through conductor **17** and conduit **20** between

the room and the junction where the two are connected together is great enough to load coil 43 to such an extent as to load tank circuit 34 and inductance coil 37 so that the oscillator circuit does not oscillate.

The values of the components given below have been tried and work satisfactorily in the circuit but obviously other values may be used and therefore these values are given only as an example and are not intended to be limiting on the disclosure.

Component:	Value
Tube 22 } Tube 23 }	7N7
Resistor 50 ---------- kilohms--	470
Resistor 54 ---------- ohms--	500
Capacitor 36 ---------- micromicrofarads--	500
Capacitor 44 ---------- microfarad--	.5
Capacitor 51 ---------- do----	0.01
Capacitor 52 ---------- do----	0.005
Capacitor 55 ---------- do----	4.0
Capacitor 70 ---------- do----	1.0

Operation of figure 1

The oscillatory condition of the circuit is determined by the loading on coil 43. When the current flows through coils 35 and 37 a voltage is induced in coil 43. The loading, or impedance, connected to coil 43 then determines the current flow through the coil. This current induces a voltage back into the coils 35 and 37. When the loading on coil 43 is heavy the voltages induced back into coils 35 and 37 are insufficient to cause the circuit to oscillate. Conversely, a light loading on coil 43 results in a large current through the coil 43 and large voltages induced in coils 35 and 37 to bring about oscillation.

When the circuit is oscillating the anode 24 of oscillator tube 22 draws very little current, which current is far less than that necessary to energize relay winding 40 to open contacts 56 and 57 against the action of spring 60. The high frequency alternating voltage induced in coil 37 is fed back to control electrode 25 through capacitor 51 which acts as a short circuit for high frequency potentials to effectively place control electrode 25 at the same potential as the lower terminal of coil 37.

Under oscillatory conditions the control electrode of an oscillator tube draws appreciable grid current. This current is a pulsating direct current with the electron flow from cathode to control electrode on alternate half cycles.

As can be seen in the drawing, a circuit is completed between the control electrode and cathode through resistor 50, with capacitor 51 in parallel, conductor 17, and coil 37 to the cathode. The flow of current through this circuit under oscillatory conditions produces a voltage drop across resistor 50 and thus drives the control electrode 25 negative with respect to grounded conductor 17. During the half cycles the current flows from the control electrode to the cathode, capacitor 51 is charged up and on the succeeding half cycles when no grid current is drawn by the control electrode capacitor 51 discharges through resistor 50. This charging and discharging maintains the control electrode 25 negative with respect to cathode 26.

On the half cycles that the control electrode draws grid current there is also a current flow through coil 37 which causes cathode 26 to be positive with respect to grounded conductor 17. During the half cycle that no grid current is drawn the cathode is at ground potential but, as has been seen, the control electrode 25 is negative with respect to the grounded conductor during the entire cycle and thus is always negative with respect to the cathode.

Control electrode 31 of amplifier tube 23 is directly connected to control electrode 25 of oscillator tube 22. Thus, with control electrode 25 having a negative direct voltage impressed thereon with respect to ground potential, the control electrode 31 is also negative with respect to ground potential and does not conduct.

When the oscillator tube is in a non-oscillatory condition there is very little grid current drawn by the control electrode and thus there is little voltage drop across resistor 50. With the control electrode not driven to as great a negative potential as it is under oscillatory conditions, the tube draws appreciable current.

Because control electrode 31 is directly connected to control electrode 25 the direct voltage potential on control electrode 31 is also driven in a direction with respect to ground potential so that and tube 23 also conduct. The condition of both tubes 22 and 23 is sufficient to energize relay winding 40 and to thus break the connection between contacts 56 and 57.

When the temperature is below that at which the temperature sensitive switch, shown as the bimetal vane, is set, the switch 67 is open and the inductance coil 43 is loaded by the entire impedance of the grounded conductor 17 and the conduit 20 between their connection to the coil 43 and the junction where they are directly connected together. With the circuit constants properly adjusted this impedance loads the coil 43 to such an extent that the voltage induced back into coils 35 and 37 is too small to permit the oscillator circuit to oscillate. As a result both the oscillator tube 22 and the amplifier tube 23 conduct and together operate to energize relay winding 40.

When the relay winding 40 is energized it operates upon movable contact 56 to pull against spring 60 and holds the connection between contacts 56 and 57 open so that warning light 62 is not energized.

When the temperature becomes so high as to indicate a fire, or dangerous condition, the bimetal switch 67 closes to effectively short out most of the impedance between the grounded conductor 17 and ground conduit 20 and decrease the loading on coil 43. When this condition occurs the loading on coil 43 is light enough to permit the oscillator circuit to oscillate. When the oscillator tube is oscillating there is, as has been previously stated, very little plate current drawn by the oscillator tube. At the same time amplifier tube 23 is placed in a nonconductive condition due to the negative voltage placed on control electrode 31 with respect to ground. As a result, relay winding 40 is deenergized permitting spring 60 to pull movable contact 56 against contact 57 and completing the energizing circuit to the warning light 62 to give an alarm. Obviously, a bell could be placed into the circuit to be energized to give an audible alarm. Further, both a bell and light could be used together to give both an audible and a visual alarm.

In the event that something should go wrong with the oscillator or amplifier circuit such as a broken connection or a defective tube the energization of relay winding 40 is insufficient to hold the contacts in the open position and the connection between contact 56 and 57 is closed to cause warning light 62 to give an indication that something is wrong. Also if there should be a power failure so that the oscillator and amplifier circuit is not energized the relay winding 40 is deenergized and again the warning light 62 is lit to give an alarm. It can thus be seen that in the event of failure of any of the components or the power source the circuit "fails safe."

Description of Figure 2

The circuit of Figure 2 differs from that of Figure 1 only in the manner in which the flame sensing circuit is connected to the power system. Corresponding parts in the two circuits have like references. In the circuit shown in Figure 2 the inductance coil 43 is connected in series with capacitor 44 across power conductors 10 and 11 by the following circuit: from conductor 10 through conductor 16, capacitor 44, conductor 46, coil 43, and conductors 45 and 17 to power conductor 11. Temperature sensitive switch 67 in series with capacitor 70 is connected across power conductors 10 and 11 by the following circuit: from conductor 10 through conductor 16, capacitor 70, temperature sensitive switch 67, and conductors 71 and 17 to power conductor 11.

Operation of Figure 2

In the circuit of Figure 2 the inductance coil 43 is loaded by the impedance "looking back" to the power source. In a specific example this impedance of the power lines is of the order of 8 ohms and, with the proper circuit constants, loads the oscillator circuit sufficiently to prevent oscillation. With the circuit not oscillating, relay winding 40 is energized to hold the energizing circuit to warning light 62 open and prevent energization of the light.

When the temperature reaches such a level that the temperature sensitive switch 67 is closed the impedance across coil 43 is reduced from approximately eight ohms to the order of three ohms. This loading is sufficiently

light, with the proper circuit constants, to permit the oscillator circuit to oscillate and cause relay winding **40** to be deenergized. When the winding is deenergized contacts **56** and **57** close due to the action of spring **60**, and warning light **62** is energized. It is, of course, understood that there are other values of power line loadings and that loadings other than three ohms by the switch **67** may be used.

With the oscillator circuit, the loading coil, and the temperature sensitive switch all being energized across the power line it is possible to connect all of them to conductors **16** and **17** which could be connected into a plug for insertion into a wall socket. Thus a simple and easy installation of this system can be made which would take only a matter of several seconds. If desired, the oscillator and loading coil could be connected to one wall plug with the temperature sensitive switch connected to a second wall plug, each of which would be coupled into a separate wall socket, the only provision being that the conductors energizing both wall sockets be on the same power line so that closing of the contacts of the temperature sensitive switch would short out the impedance of the power lines and reduce the loading on the coupling coils.

The following values differ from their counterparts in Figure 1 and are given merely as an example of values which may be used to give satisfactory operation. The components having the same values as their counterparts are not repeated.

Component:	Value
Tube **22** } Tube **23** }	12AU7

Though I have shown preferred modifications of my fire alarm system it is obvious that changes and modification will be apparent to those skilled in the art and it is to be understood that I limit myself only to the extent of the appended claims.

I claim as my invention:

1. Detecting apparatus using existing conventional electric power cables for a fire alarm system having in combination: an oscillator circuit comprising an electron tube having an anode, a control electrode and a cathode, a first inductance coil between said control electrode and cathode, a second inductance coil between said anode and control electrode; means energizing said circuit from a voltage source through existing electric power conductors one of which is grounded; a third inductance coil inductively coupling said first and second coils; means connecting the third coil between the grounded conductor and a ground conduit about the power conductors such that the impedance of the conductor and conduit loads the third coil to prevent the circuit from oscillating; and a temperature sensitive switch connected across the grounded conductor and conduit which, when said switch is actuated, reduces the loading on the third coil and causes the circuit to oscillate.

2. In combination: an oscillator circuit comprising an electron tube having an anode, a control electrode and a cathode, a first inductance coil between said control electrode and said cathode, a second inductance coil between said anode and said cathode; means energizing said circuit from existing conventional conductors from a voltage source, one of the conductors being grounded; a third inductance coil inductively coupling said first and second coils; means connecting the third coil between the grounded conductor and a ground conduit about the power conductors such that the impedance of the conductor and conduit loads the third coil to prevent the circuit from oscillating; and a switch connected across the third coil which, when said switch is actuated, reduces the loading on the third coil and causes the circuit to oscillate.

3. In combination: an oscillator circuit, comprising at least an inductance coil connected across a conductor forming part of an existing conventional power supply system and a conduit about the conductor, the conduit also being a conductor; means connecting the conductor and conduit to each other at a distant point such that the impedance of the conductor and conduit loads the inductance coil to such an extent as to prevent the oscillator circuit from oscillating; a switch; and means so connecting said switch across the conductor and conduit at a point remote from said inductance coil that, when said switch is actuated, the loading on the coil is reduced and the circuit oscillates.

4. Detecting apparatus using existing conventional electric power cables for a fire alarm system comprising in combination: an oscillator circuit comprising an electron tube having an anode, a control electrode and a cathode, a first inductance coil between said control electrode and said cathode, a second inductance coil between said anode and said cathode, and a third inductance coil inductively coupling said first and second coils; means energizing said circuit from a pair of existing conductors from a voltage source; means connecting said third coil in series with a capacitor between one of the pair of conductors and a grounded shielding conduit about the pair of conductors, the one of the pair of conductors being grounded, such that the impedance of the one of the pair of conductors and the conduit loads the third coil and prevents the circuit from oscillating; and a temperature sensitive switch connected in series with a capacitor across the one conductor and the conduit at a point remote from the connections of said third coil and capacitor in series with said third coil across the one conductor and conduit, which, upon a sufficient rise in temperature closing said switch, shorts out a portion of the impedance of the one conductor and conduit loading the third coil and causes the circuit to oscillate.

5. Detecting apparatus using existing conventional electric power cables for a fire alarm system comprising in combination: an oscillator circuit comprising at least an inductance coil connected across a grounded conductor and a grounded shielding conduit about the conductor forming part of an existing conventional electric power cable, the conductor and conduit being connected to each other at a distant point such that the impedance of the conductor and conduit loads the inductance coil and prevents the oscillator circuit from oscillating; a temperature sensitive switch; and means so connecting said switch across the conductor and conduit at a point remote from the connections of said coil to the conductor and conduit that, upon a sufficient rise in temperature closing said switch, a portion of the impedance loading said coil is shorted out and causes the circuit to oscillate.

6. Detecting apparatus for a fire alarm system for use in a building having a conventional shielded cable for supplying electrical power to electrical equipment in various areas thereof, said apparatus comprising in combination: an oscillator comprising an electron tube and a tuned circuit including a first inductance coil, said oscillator being adapted to be connected to the voltage supply conductors of the shielded cable to be energized thereby, the shield of the cable being a further conductor, and said oscillator being adapted to be located in one portion of the building and comprising an indicator for indicating when the state of oscillation of said oscillator is changed; a coupling circuit for said oscillator comprising a second inductance coil inductively coupled to said previously named coil and having the terminals thereof connected to two of the conductors of the cable, said coupling circuit being located in the same area as said oscillator; and a fire responsive switching mechanism adapted to be located in an area remote from said oscillator and said coupling circuit and into which area the cable extends for supplying power to electrically operated apparatus within that area, said switching mechanism being connected between the same two conductors as said second coil so that upon closure of said switching mechanism a circuit is completed, including said second inductance coil, the two conductors to which the second coil and switching mechanism are connected and said switching mechanism, shorting out a portion of the impedance of the two conductors loading said second coil.

7. Detecting apparatus for a fire alarm system for use in a building having a conventional shielded cable for supplying electrical power to electrical equipment in various areas thereof, said apparatus comprising in combination: an oscillator comprising an electron tube and a tuned circuit including a first inductance coil, said oscillator being adapted to be connected to the conductors of the shielded cable to be energized thereby and said oscillator being adapted to be located in one portion of the building and comprising an indicator for indicating when the state of oscillation of said oscillator is changed; a coupling circuit for said oscillator comprising a second inductance coil inductively coupled to said previously named coil and having the terminals thereof connected

to a first of the conductors of the cable and the shield thereof said coupling circuit being located in the same area as said oscillator; and a fire responsive switching mechanism adapted to be located in an area remote from said oscillator and said coupling circuit and into which area the cable extends for supplying power to electrically operated apparatus within that area, said switching mechanism being connected between the first conductor of the cable and the shield thereof so that upon closure of said switching mechanism a circuit is completed, including said second inductance coil, the first conductor, the shield and said fire responsive switching mechanism, shorting out a portion of the impedance of the first conductor of the cable and the shield thereof loading said second coil.

8. A fire detecting device using an existing electrical power system both as a power source and an electrical load for the device, comprising; an oscillator circuit having at least one inductance coil, power circuit means including conductors adapted to be connected to an electrical power system to continuously supply power to said oscillator, load circuit means including said coil and conductors adapted to be connected to the electrical power system to normally load said coil such as to prevent the circuit from oscillating; and a temperature responsive switch connected across said load circuit means which, when said switch is actuated, reduces the loading on said coil and causes the circuit to oscillate.

9. A fire detecting device using an existing electrical wiring system both as a power source and as an electrical load for the device, comprising; an oscillator circuit comprising an electron tube having an anode, a control electrode and a cathode, a first inductance coil between said control electrode and said cathode, and a second inductance coil between said anode and said cathode, said first and second coils being inductively coupled; power circuit means including conductors adapted to be connected to an existing wiring system to continuously supply power to said oscillator circuit, load circuit means arranged to influence the inductive coupling of said first and second coils and including conductors adapted to be connected to the existing wiring system to normally prevent said oscillator from oscillating, and a temperature reponsive switch connected to said load circuit means to cause said oscillator to oscillate when said switch is actuated.

10. An electronic fire detecting device using an existing electrical wiring system both as a power source and as an electrical load for the electronic device, comprising; an oscillator circuit comprising, an electron tube having an anode, a control electrode and a cathode, a first inductance coil electrically connected between said cathode and said control electrode, a second inductance coil electrically connected between said anode and said cathode, and a third inductance coil inductively coupling said first and second coils; power circuit means including conductors adapted to be connected to an existing electrical wiring system to continuously supply power to said oscillator circuit, loading circuit means including said third coil and conductors adapted to be connected to the existing wiring system to connect said third coil to the existing wiring system to load said third coil and prevent said oscillator circuit from oscillating, and a temperature responsive switch connected across said third coil to reduce the loading on said third coil when said switch is actuated to cause said oscillator circuit to oscillate.

11. A condition sensing device using an existing electrical power system both as a power source and as an electrical load for the device, comprising; an oscillator circuit comprising an electron tube having an anode, a control electrode and a cathode, a first inductance coil between said control electrode and said cathode, a second inductance coil between said anode and said cathode, and a third inductance coil inductively coupling said first and second coils; power circuit means including conductors adapted to be connected to an existing power system to continuously supply power to said oscillator circuit, load circuit means including said third coil and conductors adapted to be connected to the existing power system, said load circuit means being adapted to load said third coil to thereby prevent said oscillator circuit from oscillating; and a condition sensitive switch connected across the third coil which, when actuated reduces the loading on the third coil and causes the circuit to oscillate.

12. A fire detecting device using an existing electrical power cable as a source of power and as an electrical load, comprising, an oscillator circuit comprising an electron tube having an anode, a control electrode and a cathode, a first inductance coil between said control electrode and said cathode, a second inductance coil between said anode and said cathode; power circuit means including conductors adapted to be continuously connected to power conductors of an existing electrical power cable; a third inductance coil inductively coupling said first and second coils; load circuit means including said third coil and conductors adapted to be connected to the power conductors of the existing electrical power cable to connect said third coil across the power conductors such that the impedance of the power conductors loads the third coil to prevent said oscillator circuit from oscillating; and a temperature responsive switch connected across the power conductors which, when said switch is actuated, reduces the loading on the third coil and causes the circuit to oscillate.

13. A condition sensing device using an existing electrical power cable as a source of power and as an electrical load, comprising; an oscillator circuit comprising at least an inductance coil; power circuit means including said inductance coil and conductors adapted to be connected to a pair of power conductors of an existing electrical cable to connect the inductance coil across the power conductors such that the impedance of the power conductors loads the inductance coil to such an extent as to prevent the oscillator circuit from oscillating; a condition sensing switch; and means including further conductors adapted to be connected to the power conductors at a point remote from said inductance coil to so connect said switch that when said switch is actuated, the loading on the coil is reduced and said oscillator circuit oscillates.

14. In combination: an oscillator circuit, comprising at least an inductance coil connected across a conductor forming part of an existing conventional power supply system and a conduit about the conductor, the conduit also being a conductor, said oscillator having a first and a second condition of operation; means connecting the conductor and conduit to each other at a distant point such that the impedance of the conductor and conduit load the inductance coil to such an extent as to cause said oscillator to assume said first condition of operating; a switch; and means so connecting said switch across the conductor and conduit at a point remote from said inductance coil that, when said switch is actuated, the loading on the coil is altered and the oscillator assumes said second condition of operation.

15. A condition sensing device using an existing electrical power system both as a power source and as an electrical load for the device, comprising: an oscillator circuit having at least one inductance coil, said oscillator having a first and a second condition of operation, power circuit means including conductors adapted to be connected to an electrical power system to continuously supply power to said oscillator, load circuit means in cluding said coil and conductors adapted to be connected to the electrical power system to load said coil such as to cause said first condition of operation of said oscillator circuit; and a temperature responsive switch connected across said load circuit means which, when said switch is actuated, alters the loading on said coil and causes said second condition of operation of said oscillator circuit.

16. An electronic fire detecting device using an existing electrical wiring system both as a power source and as an electrical load for the electronic device, comprising: an oscillator circuit comprising, an electron tube having an anode, a control electrode and a cathode, a first inductance coil electrically connected between said cathode and said control electrode, a second inductance coil electrically connected between said anode and said cathode, and a third inductance coil inductively coupling said first and second coils; said oscillator circuit having a first and a second condition of operation depending upon the loading of said third coil; power circuit means including conductors adapted to be connected to an existing electrical wiring system to continuously supply power to said oscillator circuit, loading circuit means including conductors adapted to be connected to the existing wiring system to connect said third coil to the existing wiring system to load said coil and cause said first condition of operation of said oscillator circuit, and a temperature responsive switch connected across said third coil to alter the loading on said third coil when said switch is actuated to thereby

cause said second condition of operation of said oscillator circuit.

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