June 21, 1966 L. W. McCORKINDALE 3,257,653

ALARM SYSTEM

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FIG. 1

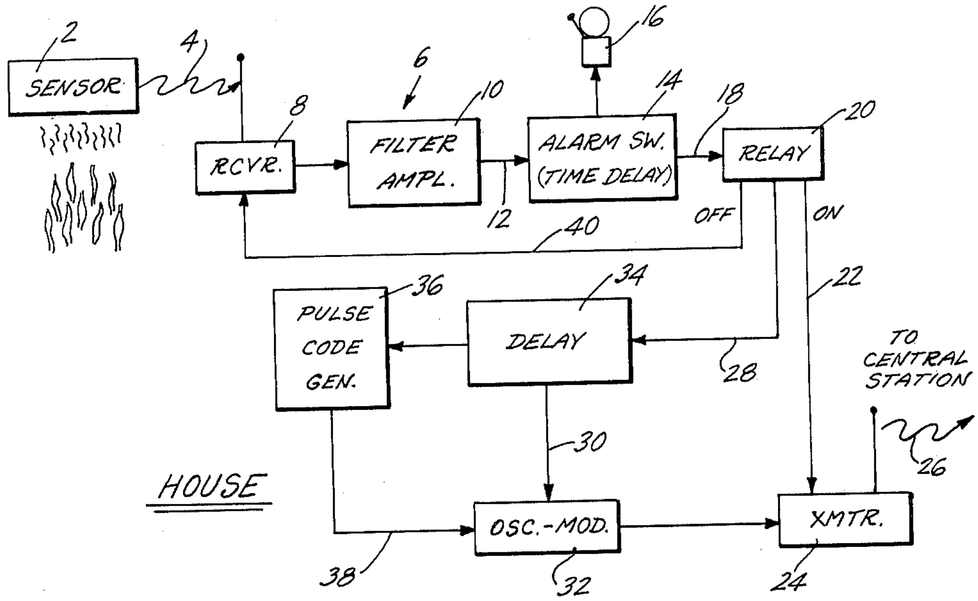

FIG. 2

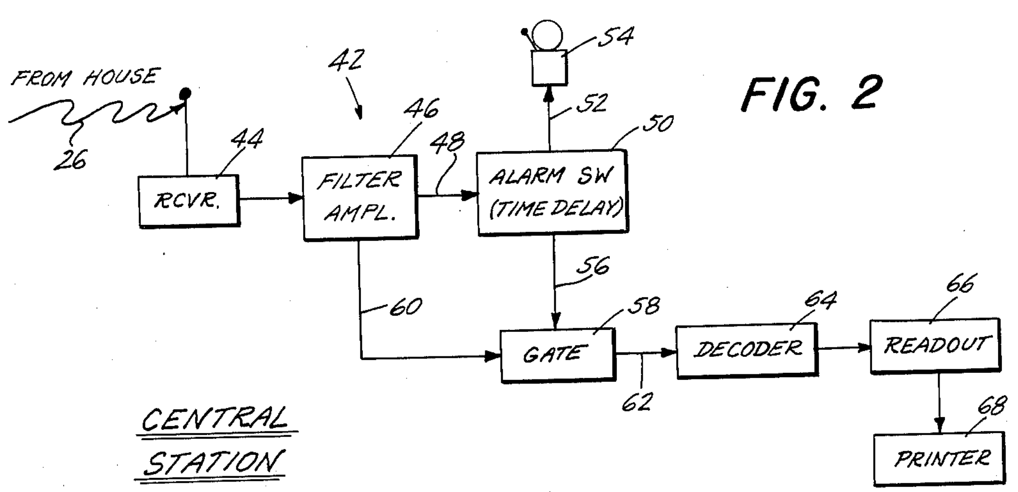

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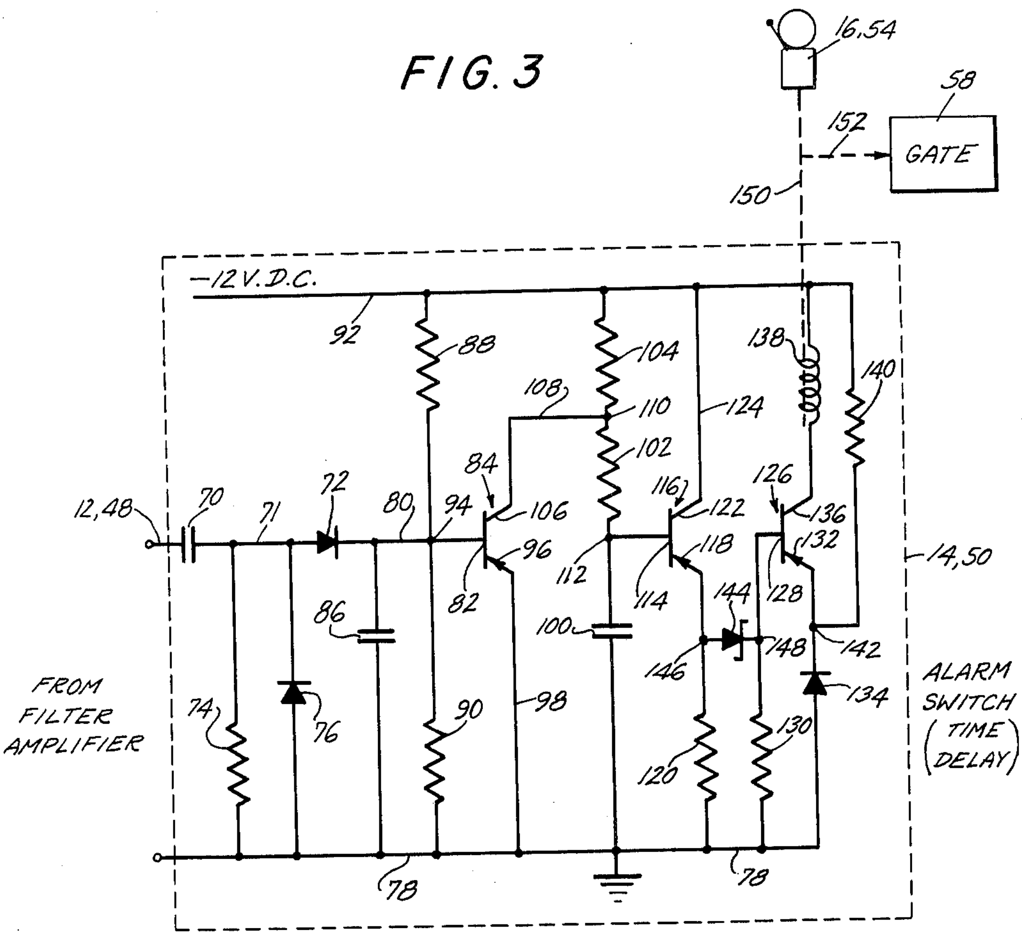
FIG. 3



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ALARM SYSTEM

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13 Claims. (Cl. 340—224)

The present invention relates to an alarm system, and more specifically to one adapted to sense the occurrence of an event calling for notification or alarm (i.e. the presence of an intruder or the existence of a fire) and actuating an alarm at a more or less remote location when that event is sensed.

Alarm systems of this type which are in use today are almost exclusively of the wire-transmission type, that is to say, a conductive wire is connected between the sensing element and the alarm. This places a significant limitation on the use of such systems. They require more or less permanent installations, they are expensive, and unless existing communication lines such as telephone wires are leased, a quite expensive matter, the distance between the sensor and the alarm is greatly limited. Thus if one wished to place fire detecting elements at various locations in a home, and render them effective to actuate an alarm such as a bell located in a particular place such as the bedroom hall, wiring would have to be laid from each sensing device to the alarm device. Any change in the location of any one of the devices would necessarily require a corresponding change in the wiring. If an alarm indication were desired not only in the individual building which is protected but also in a remote central station, such as a fire house, special telephone wires would have to be employed.

Proposals have been made for substituting wireless transmission for wired transmission, thus avoiding the above mentioned drawbacks. However, such wireless systems, and particularly systems capable of notifying a remote central station of the existence of a particular emergency, have not been adopted because of the adverse electromagnetic interaction between the radio signals involved in the alarm system and other radio signals transmitted for other purposes. (The term "radio" is here used generically to indicate any type of relatively high frequency radiation communication system.) The various frequency bands available for radio use are in great demand because of the many different types of intelligence which are communicated thereover, and their use is rigidly controlled by appropriate governmental agencies. As a practical matter it is difficult or impossible to have a channel assigned specifically to a given alarm system, even when the alarm is to be acted upon by a governmental entity such as the city police force, and particularly when the alarm is to be acted upon by a private organization such as a commercial protective agency. Not only may the transmission of alarm signals interfere with other intelligence being transmitted on the particular channel used, but in addition that other intelligence may well actuate the alarm system, thereby producing false alarms.

It is the prime object of the present invention to devise an alarm system of the wireless type which will avoid the abovementioned disadvantages and which, more particularly, will operate in such a manner that it can be used on a given frequency channel which is not exclusively allocated thereto, but on which other signals (here termed "extraneous signals") are also transmitted at the same time with little effect, the other intelligence being transmitted over that channel and without itself being operatively affected by the extraneous signals.

The problem involved is complicated by the fact that, particularly where a remote central station serving a plurality of subscribers is concerned, means must be provided at that central station for identifying the particular subscriber from whose premises a given alarm signal emanates. The signal sending means at the subscriber's premises may readily be adapted to emit a signal perculiar to itself and therefore identifiable by suitably designed receiving equipment at the central station, but the need for such a code or identifying signal complicates the problem of interaction with the other intelligence being transmitted on the frequency channel used. In particular, the identifying signal must not be masked or garbled by the extraneous transmissions.

In accordance with the present invention these objectives are achieved by providing, at the receiving station, a time delay means which is not only sensitive to the reception of the signal peculiar to the system being used, but which is also sensitive to and actuated in accordance with, the length of time that said signal is received and, more specifically, to the length of time that said signal is continuously received.

The signal itself is preferably in the form of a carrier frequency located within the frequency channel allocated to the system and shared by that system with other transmissions, that carrier frequency being modulated in a predetermined characteristic manner. The signal receiving means is sensitive only to the reception of a signal having this characteristic modulation, and in that way false alarms caused by extraneous transmissions are minimized. However, minimization of false alarms is not enough; they must be substantially completely eliminated. It is entirely possible that, by happenstance, the other transmissions in the frequency channel being used may contain bursts of modulations similar to those used to identify the alarm signal in the system under discussion. Accordingly, the signal receiving means is made sensitive to the length of time that a predetermined signal is continuously received. Thus the reception by the signal receiving means of a series of rapid pulses from extraneous signals will be of no effect; each time gap between pulses will, in effect, re-start the time measuring operation. Hence only the reception of the predetermined signal continuously for a predetermined period of time, such as 3 or 5 seconds, will condition the receiving means to actuate the alarm.

In the preferred form here specifically disclosed the alarm system may comprise two signal-sending-and-receiving stages, either or both of which may be provided with the time-sensing delay arrangement just described. The first stage consists of sensors located in a given building and a signal receiving means located in the same building, the alarm means thereof comprising, preferably in addition to an audible alarm, the transmitting of a radio signal to a central station. The second stage consists of the sending of that radio signal, the reception thereof at the central station, and the actuation of an alarm at that central station. Since the central station will serve a plurality of individual installations the signal sent to the central station should also include a special signal identifying the particular location from which the signal emanates, and the central station includes means for translating this identifying signal into intelligence which will indicate the location of the emergency. It is preferred that the signal transmitted to the central station consist first in point of time of an actuating signal which is sensed at the central station and which, when sensed continuously for a predetermined period of time, conditions the central station to the reception and translation of the subsequently sent identifying signal.

In order to reduce the possibility of interference with the other transmissions on the frequency channel being used, means are also preferably provided for automatically turning off the transmitter, and particularly the transmitter from an individual location to the central station, after it has operated for a long enough period of time to transmit the desired intelligence to the central station. This period of time is preferably long enough to permit the transmitter to send its identifying signal a plurality of times, thereby minimizing the possibility that the identifying signal might be rendered unintelligible by extraneous transmissions which might be in progress on the frequency channel in question.

To the accomplishment of the above, and to such other objects as may hereinafter appear, the present invention relates to an alarm system as defined in the appended claims and as described in this specification, taken together with the accompanying drawings in which:

FIG. 1 is a block diagram representation of the first stage of the overall system here disclosed, the various elements of that first stage being designed to be located in relatively close proximity to one another (e.g., in a particular house or building), the alarm including the sending of alarm signals to a remote station;

FIG. 2 is a block diagram of the second stage of the overall system here disclosed, that second stage designed to be located at a central station; and

FIG. 3 is a diagram of a circuit employed to measure the length of time that a predetermined signal is continuously received and to actuate an alarm in accordance therewith.

The first stage of the overall system, illustrated in FIG. 1, comprises a plurality of sensor unit **2** positioned at desired locations for a home and sensitive to the occurrence of a particular event, such as the existence of fire or the presence of an intruder. Each of these sensor units **2** may be entirely self-contained and will be effective, when the particular event in question is sensed thereby, to emit an alarm signal **4**. Each of the sensor units **2** may contain a crystal controlled radio transmitter provided with a characteristic tone modulation. The unit may be powered by a battery, and the operation of the transmitter may be triggered by a closing of a switch under the control of the sensing instrumentality (such as a temperature-sensitive device) forming a part of the sensor unit **2**. The sensor unit **2** may be protected, as by encapsulation, so that it will reliably function continuously over an appreciable period of time (e.g., 3 minutes) even when subjected to high temperatures on the order of 1000° F. In most home or industrial installations it will not be necessary that the sensor units **2** be differentiated one from the other, so that each may emit the same tone-modulated radio frequency signal **4**, as indicated in FIG. 1.

Located at some desired central location within the home or building, such as in the bedroom hall or in a supervisory office, is a receiving system generally designated **6**. That receiving system comprises a radio receiver **8** which is tuned to the carrier frequency of the signal **4** and which is connected to a filter amplifier **10** the output **12** of which includes only the tone modulation of the signal **4**. The purpose of the filter is to ensure that the remainder of the circuitry in the receiving means **6** will respond only to the modulated signal **4** and not to different signals or signals from other sources—extraneous signals using the same or substantially the same carrier frequency, or signals emanating from sensor units **2** in the neighboring buildings, which should be provided with different carrier and/or modulation frequencies.

The output **12** from the filter amplifier is fed to a time delay switch means **14** which is so designed as to measure the length of time that the modulation signal is continuously received thereby. The time-sensing arrangement in the switch means **14** is non-cumulative and quick-resetting, so that the reception thereby of a plurality of pulses at the predetermined frequency, each pulse lasting for a period of time less than that required but the total period of time that the pulses are received exceeding that required time, will not have any operative effect. It is only when the modulated signal is received continuously for a predetermined required period of time that the time delay control is rendered effective.

When the time delay control is rendered effective an alarm **16**, indicated by the bell is actuated. The alarm **16** is shown as an audible one for obvious reasons, but a visual alarm, such as a light, could also be employed. In addition, the output **18** from the time delay switch means **14** may actuate a relay **20** which in turn, as indicated by the line **22**, actuates a radio transmitter **24** designed to emit radio signals **26** at a predetermined carrier frequency (which may be the same as or different from the carrier frequency of the signal **4**). The relay **20** also, as indicated by the lines **28** and **30**, actuates a modulator **32**, so that a predetermined tone modulation is impressed upon the carrier frequency of the signals **26**. These signals **26** also constitute a form of alarm supplementary to the audible (and visual, if desired) alarm **16**.

The lines **28** and **30** connecting the relay **20** to the modulator **32** are shown as passing through a delay circuit **34**. This delay circuit may be ineffective insofar as initial energization of the modulator **32** is concerned, so that for a predetermined period of time on the order of thirty seconds, a continuous tone-modulated signal **26** is sent out by the transmitter **24**. After that period of time, the delay circuit **34** is active to disconnect the lines **28** and **30** and to connect the line **28** with pulse code generator **36**, the latter then connecting to and controlling the modulator **32**, as indicated by the line **38**. During the ensuing period of time the pulse code generator **36** actuates the modulator **32** so as to transmit a series of coded pulses of modulation peculiar to the individual location of the system of FIG. 1. For example, a coded number, consisting of three digits, may be transmitted by producing a burst of pulses at the modulation frequency with a repetition rate of three cycles per second, the number of pulses being numerically equal to the first digit of the coded number. After a pause of one second during which no modulation is impressed upon the transmitter **24**, a second similar burst of pulses corresponding to the second digit of the identifying number will ensue. This will be followed by a third pause of one second and then a burst of pulses corresponding to the third digit will ensue. This may be followed by another pause, of perhaps two seconds, after which the coded number is repeated. Repetition of the coded number for a plurality of times, perhaps five times, may follow, after which the delay circuit **34** may be made effective to shut down the transmitter **24** completely, the system thereafter being inoperative until it is manually reset. It is preferred, as indicated by the line **40**, that the relay **20** turn off the receiver **8** once the alarm **16** has been sounded and the transmitter **24** has been energized.

The initial continuous tone modulated signal **26** is utilized to actuate the signal receiving means generally designated **42** (see FIG. 2) at a central station. This signal receiving means **42** comprises a receiver **44** which is connected to a filter amplifier **46**, the latter, like the filter amplifier **10** of FIG. 1, being effective to transmit, in amplified form, the tone modulation on the signal **26**. It is connected, as indicated by line **48**, to a time delay switch means **50** which may be similar to the time delay switch means **14** of FIG. 1, and which will be effective to measure the time that the tone modulation is continuously received thereby. Since it measures only continuous reception of this signal, it will not be affected by bursts or pulses of said signal which may be received thereby from extraneous signals. Only when the desired signal has been properly and continuously received for the predetermined period, which may be on the order of five seconds, will the time delay switch means **50** be effective, as indicated by the line **52**, to actuate the alarm **54**, indicated at FIG. 2 as an audible alarm such as a bell and which, if desired, may also be supplemented by a visual alarm. In this way the supervisory personnel at the central station will be alerted to the existence of an emergency at one of the subscribing stations.

Actuation of the time delay switch **50** by the continuous reception of the predetermined tone modulation is also effective, as indicated by line **56**, to open normally closed gate **58**. The output of the filter amplifier **46** is then connected by line **60**, open gate **58** and line **62**, to a decoder **64**. This decoder **64** is designed to be sensitive to the pulse identifying signals which are subsequently sent as part of the signal **26** and will actuate the readout **66** and a printer **68** in accordance therewith.

What happens at the central station is substantially as follows: When the first portion of the signal **26** (the continuously tone modulated portion or actuating portion thereof) is first received nothing happens, except that the time delay switch **50** commences to time. When that actuating signal portion has been received continuously for a predetermined period of time, such as five seconds, the alarm **54** is sounded and the gate **58** is opened so as to render operative the decoder **64**. Then, when the transmitter **24** at the subscriber station stops sounding its continuously modulated actuating signal portion and commences to send its coded pulse modulated identifying signal portion, that identifying signal is decoded by the decoder **64** and the numbers corresponding to those pulses are printed by the printer **68**, thus indicating to the supervisory personnel the identity of the subscriber station where the emergency exists. Since each series of identifying numbers is preferably transmitted by the transmitter **24** at the subscriber station for a plurality of times, the printer will produce a plurality of sets of numbers. The reason that a plurality of transmissions is desired is to eliminate, as a practical matter, any adverse interference effects deriving from extraneous transmissions which might give rise to errors in the numbers printed. While such interference might cause errors in one set of signals, it is unlikely that it will cause errors in all of these sets of signals. Thus, if the coded signal being sent from the subscriber station is **121**, and if that coded signal is sent five times, and if the printer **68**, because of interference from extraneous signals, prints a sequence as follows: **321, 121, 352, 121, 121**, it will be obvious that the proper identifying number is **121**.

The various elements of the system disclosed in block form in FIGS. 1 and 2 may take a wide variety of forms, all of which are well known, but the provision of a non-cumulative quick-resetting time delay means sensitive to the continuous reception of a predetermined signal presents certain problems in design. Accordingly, in FIG. 3 I show a circuit which I have devised for this purpose which appears to function in a particularly advantageous manner. It can constitute either the element **14** of FIG. 1 or the element **50** of FIG. 2 or both. The output line **12** or **48** from the filter amplifier **10** or **46** is coupled by capacitor **70** and line **71** to rectifier **72**. Resistor **74** and rectifier **76** are connected in parallel between the line **71** and ground **78**. The rectifier **72** is connected by line **80** to the base **82** of transistor **84**. Capacitor **86** is connected between line **80** and ground. The voltage divider comprising resistors **88** and **90** is connected between a −12 volt D.C. biasing line **92** and ground **78**, with the base **82** of transistor **84** connected to point **94** between the resistors **88** and **90**, the point **94** being on the line **80**. The emitter **96** of the transistor **84** is connected by line **98** to ground **78**. A capacitor **100** is connected between line **92** and ground **78** in series with resistors **102** and **104**. The collector **106** of transistor **84** is connected by line **108** to point **110** between the resistors **102** and **104**. Point **112** between the capacitor **100** and resistors **102** is connected to the base **114** of transistor **116**. The emitter **118** of transistor **116** is connected by resistor **120** to ground **78** and the collector **122** of transistor **116** is connected by line **124** to line **92**. Transistor **126** has base **128** connected by resistor **130** to ground **78**. Its emitter **132** is connected to ground **78** via rectifier **134**, and its collector **136** is connected to line **92** via relay winding **128**. The resistor **140** is connected between line **92** and point **142** between rectifier **134** and emitter **132**. A Zener diode **144** is connected between points **146** and **148**, point **146** being between emitter **118** and resistor **120** and point **148** being between base **128** and resistor **130**. The relay winding **138**, as indicated by the broken lines **150** and **152**, actuates alarm **16** or **54** and gate **58** if used (see FIGS. 1 and 2).

The operation of the circuit of FIG. 3 is as follows: The tone modulation arriving from the filter amplifier **10** or **46** will have its negative peaks substantially clamped to ground by rectifier **76**. The modulation signal will be rectified by rectifier **72** and the rectified output will be smoothed by capacitor **86**. The transistor **84** is normally biased to readily conduct, thus short circuiting or rendering ineffective capacitor **100**. When a rectified tone signal passes through resistor **90** the bias on the base **82** of the transistor **84** is changed to bias that transistor **84** to cut-off. This will occur whenever the received tone signal exceeds a predetermined magnitude, and the cut-off effect will be independent of the magnitude of the received signal provided that it exceeds that predetermined minimum value. When transistor **84** is biased to cut-off capacitor **100** will commence to charge through resistors **102** and **104**, its rate of charging being determined in known fashion by the relative values of the circuit elements **100, 102** and **104**. The capacitor **100** will affect the bias of the base **114** of the transistor **116** and will therefore control the emitter current therethrough. This will in turn control the voltage at point **146**. The arrangement is such that as the capacitor **100** charges, the emitter current of transistor **116** increases, the rate of that emitter current increase being determined by the charging rate of the capacitor **100**. When the voltage at point **146** exceeds the breakdown point of the Zener diode **144**, that Zener diode **144** will become conductive, base current will flow in transistor **126**, and the relay winding **138** will therefore be energized.

The above description has assumed that the tone signal above the predetermined minimum amplitude has continued uninterrupted for as long as it takes for the capacitor **100** to charge up to necessary value. If, however, the tone signal should be interrupted or fall below the predetermined minimum amplitude even momentarily, the cut-off bias on base **82** of transistor **84** will disappear, that transistor **84** will become conductive, and the capacitor **100** will discharge. This discharge occurs through resistor **102** but not through resistor **104**, and resistor **102** is made sufficiently small to permit very rapid discharge. Indeed, it is present only in order to limit the discharge current to a safe value. Once the capacitor **100** discharges, which will occur in a very small fraction of a second (preferably 5–15 milliseconds) its timing function (its charging) must commence from the beginning in order for it to cause actuation of the relay winding **138**. Hence the circuit is non-cumulative and quick-resetting, and actuates relay winding **138** only when a signal of predetermined magnitude has been continuously received. Moreover, because transistor **84** acts merely as a switch across capacitor **100**, the magnitude of its signal input has no effect on the delay time, provided only that the signal input magnitude exceeds a predetermined minimum value.

Purely by way of exemplification, the following circuit values are indicated for the elements of the time delay system of FIG. 3:

Capacitor **70**	.1 microfarad.
Rectifier **72**	1N483A silicon diode.
Resistor **74**	10,000 ohms.
Rectifier **76**	1N483A silicon diode.
Transistor **84**	2N1305 PNP.
Capacitor **86**	.1 microfarad.
Resistor **88**	220,000 ohms.

Resistor 90	4,700 ohms.
Capacitor 100	50 microfarads.
Resistor 102	220 ohms.
Resistor 104	100,000 ohms.
Transistor 116	2N1305 PNP.
Resistor 120	47,000 ohms.
Transistor 126	2N1372 PNP.
Resistor 130	10,000 ohms.
Rectifier 134	1N483A silicon diode.
Resistor 140	10,000 ohms.
Zener Diode 144	1N751.

It will be seen from the above that the system of the present invention can be used, both with regard to its first stage as shown in FIG. 1 and the second stage illustrated in FIG. 2, each considered individually, as well as to the combination of the two stages, on any desired frequency channel without appreciably interfering with other signals being transmitted on that channel and without itself being adversely affected by such other signals. Since, therefore, it will not be necessary that a special frequency channel be assigned to the system in question, it is obvious that it is much more readily usable for various locations than other wireless systems heretofore proposed, and that it nevertheless is characterized by all of the significant advantages inherent in wireless rather than wired signal transmission.

While the individual house installation shown in FIG. 1 is specifically disclosed as being of the wireless type as between sensor 2 and receiving system 6, and while the electrical connection between the individual subscriber station shown in FIG. 1 and the central station shown in FIG. 2 is specifically shown as being of the wireless type, it will be obvious that either one of these connections may be of the wire-transmission type if desired, without detracting from the utility and value of the system of the instant invention with regard to that communication link in the system which is of the wireless type and which is therefore subject to interaction with extraneous signals being transmitted at the same time. It will further be apparent that many variations may be made in the details of the circuit arrangements and individual modes of operation of the various components of the system, and that the nature of the alarm signals and of the identifying signals, if used, may also be widely varied, all within the scope of the invention as defined in the following claims.

I claim:

1. An alarm system comprising a sensor, a signal sending means operatively connected to said sensor so as to be actuated thereby and effective, when actuated, to send out a signal comprising a high frequency carrier signal impressed with a predetermined modulation, and signal receiving means including means effective to sense the reception of said modulation signal, alarm means, signal amplitude limiter means connected to said sensing means to limit said received modulation signal to a predetermined amplitude, and a time delay means connected to said limiter means to permit actuation of said alarm only after reception of said signal modulation, irrespective of its amplitude over a predetermined minimum, has been effective for a predetermined period of time without any interruption thereof for any period greater than a time on the order of milliseconds.

2. The system of claim 1, in which said alarm comprises a second signal sending means, and a second signal receiving means at a remote location, in signal-receiving operative relation to said second signal sending means, and effective, when a predetermined signal is received thereby, to actuate a second alarm.

3. The system of claim 2, in which said second signal sending means is effective, when actuated, to send out a second signal comprising a high frequency carrier signal impressed with a predetermined modulation, and in which said second signal-receiving means comprises second means effective to sense the reception of said second

modulation signal, second alarm means, second signal amplitude limiter means connected to said second sensing means to limit said second received modulation signal to a predetermined amplitude, and a second time delay means connected to said second limiter means to permit actuation of said second alarm only after reception of said signal modulation, irrespective of its amplitude over a predetermined minimum, has been effective for a predetermined period of time without any interruption thereof for any period greater than a time on the order of milliseconds.

4. The system of claim 2, in which said signal sending means is effective to emit an actuating signal for a given period of time, followed by an identifying signal, said actuating signal comprising said high frequency carrier signal impressed with said predetermined modulation, said signal-receiving means being effective to perform identifying functions in addition to permitting actuation of said alarm, said time delay means which forms a part of said signal-receiving means being effective to permit actuation of said alarm and to condition said signal-receiving means to perform said identifying functions only after effective reception of said actuating signal for said predetermined period of time, said predetermined period of time being no larger than, and at least an appreciable fraction of, said given period of time.

5. The system of claim 2, in which said signal sending means is effective to emit an actuating signal for a given period of time, followed by an identifying signal, said actuating signal comprising said high frequency carrier signal impressed with said predetermined modulation, said signal-receiving means being effective to perform identifying functions in addition to permitting actuation of said alarm, said time delay means which forms a part of said signal-receiving means being effective to permit actuation of said alarm and to condition said signal-receiving means to perform said identifying functions only after effective reception of said actuating signal for said predetermined period of time, said predetermined period of time being no larger than, and at least an appreciable fraction of, said given period of time, and in which said actuating signal comprises a substantially continuous tone-modulated carrier frequency emitted for said given period of time, said identifying signal comprising a series of pulses.

6. The system of claim 2, in which said signal amplitude limiter means and said time delay means comprises an output circuit operatively connected to said alarm and including a first electronic valve having a first control electrode the bias of which controls said valve and said output circuit between operative and inoperative conditions, a time delay circuit operatively connected to said first control electrode and effective to build up the bias thereon until said valve is in its operative condition, a discharge circuit operatively connected to said time delay circuit and including a normally substantially closed-circuit second electronic valve having a second control electrode, and means operatively connecting said signal to said second control electrode, so that the presence of said signal biases said second electronic valve to a substantially open-circuit condition.

7. The system of claim 2, in which said signal amplitude limiter means and said time delay means comprise an output circuit operatively connected to said alarm and including a first electronic valve having a first control electrode the bias of which controls said valve and said output circuit between operative and inoperative conditions, a time delay circuit operatively connected to said first control electrode and effective to build up the bias thereon until said valve is in its operative condition, a discharge circuit operatively connected to said time delay circuit and including a normally substantially closed-circuit second electronic valve having a second control electrode, and means operatively connecting said signal to said second control electrode, so that the presence of said signal

biases said second electronic valve to a substantially open-circuit condition, in which said operative connection between said time delay circuit and said first electronic valve comprises a third electronic valve having an output circuit and a third control electrode, said third control electrode being connected to said time delay circuit and said output circuit being operatively connected to said first control electrode via a Zener diode.

8. The system of claim 2, in which said signal amplitude limiter means and said time delay means comprise a signal input circuit, a first electronic valve having a first output circuit and a first control electrode, said signal input circuit being connected to said first control electrode, a time delay circuit including a capacitor, said first output circuit being connected across said capacitor so that said capacitor can discharge therethrough, a second electronic valve having a second output circuit and a second control electrode, said second control electrode being connected to said capacitor of said time delay circuit so as to be biased thereby, a third electronic valve having a third output circuit and a third control electrode, a biasing circuit operatively connected to said third control electrode, a Zener diode connecting said second output circuit and said biasing circuit, and a work element for actuating said alarm in said third output circuit.

9. The system of claim 1, in which said signal sending means is effective to emit an actuating signal for a given period of time, followed by an identifying signal, said actuating signal comprising said high frequency carrier signal impressed with said predetermined modulation, said signal-receiving means being effective to perform identifying functions in addition to permitting actuation of said alarm, said time delay means which forms a part of said signal-receiving means being effective to permit actuation of said alarm and to condition said signal-receiving means to perform said identifying functions only after effective reception of said actuating signal for said predetermined period of time, said predetermined period of time being no larger than, and at least an appreciable fraction of, said given period of time.

10. The system of claim 1, in which said signal sending means is effective to emit an actuating signal for a given period of time, followed by an identifying signal, said actuating signal comprising said high frequency carrier signal impressed with said predetermined modulation, said signal-receiving means being effective to perform identifying functions in addition to permitting actuation of said alarm, said time delay means which forms a part of said signal-receiving means being effective to permit actuation of said alarm and to condition said signal-receiving means to perform said identifying functions only after effective reception of said actuating signal for said predetermined period of time, said predetermined period of time being no larger than, and at least an appreciable fraction of, said given period of time, and in which said actuating signal comprises a substantially continuous tone-modulated carrier frequency emitted for said given period of time, said identifying signal comprising a series of pulses.

11. The system of claim 1, in which said signal amplitude limiter means and said time delay means comprise an output circuit operatively connected said alarm and including a first electronic valve having a first control electrode the bias of which controls said valve and said output circuit between operative and inoperative conditions, a time delay circuit operatively connected to said first control electrode and effective to build up the bias thereon until said valve is in its operative condition, a discharge circuit operatively connected to said time delay circuit and including a normally substantially closed-circuit second electronic valve having a second control electrode, and means operatively connecting said signal to said second control electrode, so that the presence of said signal biases said second electronic valve to a substantially open-circuit condition.

12. The system of claim 1, in which said signal amplitude limiter means and said time delay means comprise an output circuit operatively connected to said alarm and including a first electronic valve having a first control electrode the bias of which controls said valve and said output circuit between operative and inoperative conditions, a time delay circuit operatively connected to said first control electrode and effective to build up the bias thereon until said valve is in its operative condition, a discharge circuit operatively connected to said time delay circuit and including a normally substantially closed-circuit second electronic valve having a second control electrode, and means operatively connecting said signal to said second control electrode, so that the presence of said signal biases said second electronic valve to a substantially open-circuit condition, in which said operative connection between said time delay circuit and said first electronic valve comprises a third electronic valve having an output circuit and a third control electrode, said third control electrode being connected to said time delay circuit and said output circuit being operatively connected to said first control electrode via a Zener diode.

13. The system of claim 1, in which said signal amplitude limiter means and said time delay means comprise a signal input circuit, a first electronic valve having a first output circuit and a first control electrode, said signal input circuit being connected to said first control electrode, a time delay circuit including a capacitor, said first output circuit being connected across said capacitor so that said capacitor can discharge therethrough, a second electronic valve having a second output circuit and a second control electrode, said second control electrode being connected to said capacitor of said time delay circuit so as to be biased thereby, a third electronic valve having a third output circuit and a third control electrode, a biasing circuit operatively connected to said third control electrode, a Zener diode connecting said second output circuit and said biasing circuit, and a work element for actuating said alarm in said third output circuit.

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