

Description

The present invention relates to a paging receiver having a circuit for flashing a light emitting element and, more particularly, to a paging receiver having a circuit for selectively flashing a plurality of light emitting elements.

A current trend in the radio paging art is toward a paging receiver or pager operable with a plurality of paging numbers and/or, to promote the use of the receiver in multiple locations, with a plurality of receive frequencies. In parallel with such a trend, means for alerting a person who carries a pager to the reception of a call and means for allowing the person to confirm a receive frequency being set have been proposed in a variety of forms. For example, alerting means which assigns a different tone or a light emitting element of a different color to each paging number is available. Also available is frequency confirming means which, when a person selects a particular receive frequency which matches a particular location, displays that frequency by causing a light emitting element of a particular color to flash.

The light emitting element used with the above-described type of alerting means or frequency confirming means is usually implemented by a light emitting diode (LED). While about 2-volt power supply is needed to turn on an LED, a 1-volt battery which is easy to replace is adopted in practice for powering an LED because a pager is usually carried by a person. It is therefore necessary to install in a pager a circuit for causing an LED to flash by boosting the output of the 1-volt battery.

An example of a circuit for flashing an LED as stated above is disclosed in Japanese Laid-Open Utility Model Publication (Kokai) No. 57-39156. The circuit shown and described in this Utility Model Publication includes a 1-volt battery and a coil which is connected in parallel with an LED. Energy generated by the 1-volt battery is charged in the coil and then discharged so that the resulting counter electromotive force causes the LED to glow. Such a procedure is repeated to turn on and off the LED periodically.

An attempt to implement a flashing circuit having a plurality of LEDs of different colors by the above-described technique would result in the need for the same number of flashing circuits as the number of LEDs. More specifically, when a flashing circuit using the same number of prior art circuits as the number of LEDs is simply applied to a pager, a prohibitive number of circuit parts are needed, especially the same number of boosting coils as the number of LEDs are required. Such numerous circuit parts obstruct the miniaturization of the pager. What impedes the miniaturization

most is the large contour of the coil which is unavoidable in guaranteeing inductance necessary for boosting. Increasing the number of boosting coils in proportion to the number of LEDs would add to the overall size of a pager. This is also true with a case wherein a plurality of prior art flashing circuits are applied to the alerting means of a small-size receiver which is powered by a DC power supply.

SUMMARY OF THE INVENTION

It is therefore an object of the present invention to reduce the number of boosting coils built in a paging receiver of the type having a plurality of light emitting elements and a circuit for flashing such elements for alerting and frequency confirming purposes.

It is another object of the present invention to reduce the number of boosting coils built in a small-size receiver of the type having a plurality of light emitting elements and a circuit for flashing such elements for alerting and other purposes.

In accordance with the present invention, there is provided a radio paging receiver having a circuit for flashing a light emitting element, comprising a DC power supply, a coil element, a light emitting element circuit comprising a first light emitting element connected at a first terminal to said DC power supply means and at a second terminal to one end of the coil element, and a second light emitting element connected at a third terminal to the other end of the coil element and at a fourth terminal to ground such that the second light emitting element is identical with the first light emitting element with respect to direction, first switching means connected between the second terminal and ground, second switching means connected between the third terminal and the DC power supply means, radio signal receiving means for receiving a radio signal to produce a receive signal, memory means for storing first and second paging numbers which are assigned to said paging receiver, detection means for comparing a receive paging number contained in the receive signal with the first and second paging numbers, if the receive paging number is identical with first paging number, producing a first detect signal and, if the receive paging number is identical with the second paging number, producing a second detect signal, and control means for continuously turning on the first switching means and repetitively turning on and off the second switching means in response to the first detect signal and, for repetitively turning on and off the first switching means and continuously turning on said second switching means in response to the second detect signal.

In accordance with the present invention, there is also provided a small-size receiver having a circuit for flashing a light emitting element for informing a person of reception of a call or similar purpose, comprising DC power supply means, a coil element, receiving means for receiving signals to produce a first and a second receive signal, flashing circuit means including a first light emitting element which is connected at a first terminal to the DC power supply means and at a second terminal to one end of the coil element such that the first light emitting element is opposite to a voltage applied from the DC power source with respect to a direction, and a second light emitting element connected at a third terminal to the other end of the coil element and at a fourth terminal to ground such that the second light emitting element is identical with the first light emitting element with respect to direction, first switching means connected between the second terminal and ground, repetitively turning on and off in response to a first control signal, and continuously turning on in response to a second control signal, second switching means connected between the third terminal and the power supply means, repetitively turning on and off in response to a third control signal, and continuously turning on in response to a fourth control signal, control means for producing, in response to the first receive signal, the second and third control signals, for supplying them to the first and second switching means, respectively, for producing, in response to the second receive signal, the first and fourth control signals, and for supplying them to the first and second switching means, respectively.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a schematic block diagram showing a paging receiver with a flashing circuit embodying the present invention;

Fig. 2 is a flow chart demonstrating a specific operation of a control section shown in Fig. 1;

Fig. 3 is a diagram representative of an LED circuit also shown in Fig. 1;

Figs. 4A and 4B are timing charts showing signals which are fed from the control section to the LED circuit;

Figs. 5A and 5B are equivalent circuit diagrams each showing a condition wherein each LED in Fig. 3 is turned on;

Fig. 6 is a diagram showing a prior art circuit for flashing a light emitting element; and

Fig. 7 is a timing chart representative of signals which are fed from a control section shown in Fig. 6.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

To better understand the present invention, a brief reference will be made to a prior art light emitting element flashing circuit, shown in Fig. 6. The flashing circuit includes a 1-volt battery 51 for powering the circuit, an LED 52, and a transistor 53 for driving the LED 52. The bias of the transistor 53 is determined by resistors 54 and 55. A coil 56 is provided for boosting the 1-volt power supply. Let the circuitry consisting of the LED 52, transistor 53, resistors 54 and 55 and coil 56 be collectively called an LED circuit 59 for convenience. The flashing circuit further includes a control section 57 and a clock generator 58 for delivering a timing signal to the control section 57.

In operation, the control section 57 divides the frequency of the output signal of the clock generator 58 to produce a pulse signal whose frequency is $1/t_0$ hertz, as shown in Fig. 7. This pulse signal is applied to the LED circuit 59. For the duration of t_1 shown in Fig. 7, a current flows through the transistor 53 to charge the coil 56. In this condition, the LED 52 is not turned on. For the next duration of t_2 , the current to the transistor 53 is interrupted so that the LED 52 is turned on by counter electromotive force which is generated by the coil 56. Such a procedure is repeated periodically to turn on and off the LED 52 repeatedly.

Implementing a flashing circuit having a plurality of LEDs of different colors by the above-described technique would result in the need for the same number of flashing circuits as the number of LEDs, as discussed earlier. More specifically, when a flashing circuit using the same number of prior art circuits as the number of LEDs is simply applied to a pager, a prohibitive number of circuit parts are needed, especially the same number of boosting coils as the number of LEDs are required. Such a number of circuit parts are an obstacle to the miniaturization of a pager.

Referring to Figs. 1 to 5, a paging receiver embodying the present invention is shown which eliminates the drawback as discussed above. As shown in Fig. 1, the paging receiver or pager includes an antenna 1, a receiver section 2, a waveform shaping circuit 3, a control section 4, a P-ROM (Programmable-Read Only Memory) 5, a speaker driver 7, a speaker 8, and an LED circuit 9. A clock generator 10 and switches 11-13 are also included in the paging receiver.

In Figs. 1 and 2, after a power switch, not shown, of the pager has been turned on (step 21), a radio signal coming in through the antenna 1 is amplified and demodulated by the receiver section 2. A demodulated output of the receiver section 2 is shaped by the waveform shaping circuit 3 into a

waveform which can be processed by the control section 4. When a switch 11 connected to the control section 4 is held in a call mode (step 22), the control section 4 compares an output of the waveform shaping circuit 3 with paging numbers which are assigned to the receiver, in response to a timing signal which is delivered thereto from a clock generator 10. Assume that the P-ROM 5 stores, for example, two different paging numbers which will be referred to as an A call and a B call below.

When the signal from the waveform shaping circuit 3 is not identical with any of the two paging numbers (step 23), the program returns to the step 22. When the signal from the circuit 3 is identical with one of the paging numbers (step 23) and if a speaker switch 12 is in an ON state (step 24), the control section 4 delivers a speaker drive signal to the speaker driver 7 via a port P1 (step 25). In response, the speaker 8 produces an alert tone for notifying the user of the pager of the reception of a call. Further, the control section 4 feeds LED flash signals which are synchronous with the speaker drive signal to the LED circuit 9 via ports P2-A and P2-B (step 26). In the illustrative embodiment, the LED circuit 9 is constituted by two LEDs and circuitry for driving them. The LED flash signals fed to the LED circuit 9 via the ports P2-A and P2-B cause one of the two LEDs to flash. To facilitate distinction, the LEDs are different in color from each other. If the speaker switch 12 is in an OFF state at the step 24, the control section 4 excutes the step 26 without delivering the speaker drive signal.

Each of the speaker drive signal outputted via the port P1 and the LED flash signals outputted via the ports P2-A and P2-B is changed depending upon the kind of a call, i.e. the A call or B call. Such a change allows the A-and B-calls to be discriminated from each other by changing the alert tones from the speaker 8 and flashing only one of the two LEDs.

When the switch 11 is in a frequency confirmation mode which is distinguished from the call mode (step 22), the control section 4 outputs through the ports P2-A and P2-B frequency confirm signals associated with a particular receive frequency being set (step 26). Further, the control section 4 delivers to the receiver section 2 a receive frequency signal which is set by a switch 13 (step 28). In response, the receiver section 2 sets up a receive frequency. A set frequency confirm signal is fed to the LED circuit 9 at the intervals of frequency set to allow a person to see the frequency being set. Assuming that two different receive frequencies are available with the pager, the set frequency confirm signal may be implemented by waveforms which are individually identical with

the previously stated two LED flash signals which are in turn individually associated with the A- and B-calls.

In Fig. 1, it will be apparent that the various sections of the pager are individually supplied with power by a 1-volt battery, although not shown in the figure.

The LED circuit 9 shown in Fig. 1 is constructed and operated as described in detail hereinafter with reference to Figs. 3 to 5.

In Fig. 3, the LED circuit 9 is energized by a 1-volt battery 31. LED circuit 9 includes LEDs 32 and 33 which are different in color from each other, and transistors 34 and 35. Each of the transistors 34 and 35 has two different functions, i.e., a switching function and an LED driving function. To drive the LEDs 32 and 33, each of the transistors 34 and 35 has a high current amplifying ability. The LED flash signals individually outputted by the control section 4, Fig. 1, are applied to the base electrodes of the transistors 35 and 34 via the port P2-A and a resistor 39 and the port P2-B and a resistor 36, respectively. Resistors 36 to 39 are provided for determining the bias of the transistors 34 and 35. The reference numeral 40 designates a coil for boosting the power supply adapted for the LEDs 32 and 33.

Assume that the LED 32 only is to flash in response to the A-call when the switch 11, Fig. 1, is in the call mode, for example, or in response to a receive frequency f_1 , for example, when the switch 11 is in the frequency confirm mode. The pager is operable with any of the frequency f_1 and a different frequency f_2 which may be selected as desired. In such a case, signals shown in Fig. 4A are individually delivered to the LED circuit 9 via the ports P2-A and P2-B. More specifically, the LED flash signal from the port P2-A is changed a high level to a low level to feed a current through the transistor 35, whereby a voltage appearing at a point P shown in Fig. 3 becomes substantially equal to the voltage of the 1-volt battery 31. The resulting condition is shown in an equivalent circuit in Fig. 5A. Subsequently, as the other signal shown in Fig. 4A is fed to the LED circuit 9 via the port P2-B, a current flows through the transistor 34 for a duration indicated by a time t_{1a} with the result that the coil 40 is charged. During a period of time of t_{2a} , the current stops flowing through the transistor 34 and the resulting counter electromotive force causes only the LED 32 to turn on. The waveform appearing over the consecutive periods of the t_{1a} and t_{2a} is repeated to flash the LED 32 only. In this instance, the LED 33 does not turn on or flash because no current flows therethrough.

When the B-call is received with the call mode being selected by the switch 11 or when the frequency f_2 different from the frequency f_1 is se-

lected with the switch 11 remaining in the frequency confirm mode, only the LED 33 flashes. In this case, signals shown in Fig. 4B are individually outputted via the ports P2-A and P2-B. More specifically, the signal from the port P2-B is changed a low level to a high level to cause a current to flow through the transistor 34. Then, the potential at a point Q of Fig. 3 becomes substantially equal to ground potential. The resulting condition is shown in an equivalent circuit in Fig. 5B. This causes only the LED 33 to flash by exactly the same principle as has been discussed in relation to the LED 32. In this case, the LED 32 does not turn on or flash because no current flows therethrough.

As shown in any of Figs. 4A and 4B, the signal for turning on any of the LED 32 or 33 is fed only after the transistor associated therewith has been fully switched, i.e., a short time lag t_m exists.

In summary, it will be seen that the present invention provides a paging receiver or a small-size receiver having a light emitting element flashing circuit in which a single boosting coil is shared by two light emitting elements and, hence, the number of boosting coils required is only one half the number of LEDs. While a switching circuit implemented as a single package for transistors and a package accommodating a plurality of LEDs are put to practical use today, noticeably reducing the size of a coil is impractical because it has a mechanical structure. In this respect, the decrease in the number of coils attainable with the present invention contributes a great deal to the miniaturization of a small-size receiver.

Various modifications will become possible for those skilled in the art after receiving the teachings of the present disclosure without departing from the scope thereof. For example, while the pulse signal outputted by the control section 4 for flashing the LEDs 32 and 33 is assumed to have a duty of about 50 percent, the duty may be varied to turn on the LEDs 32 and 33 either continuously or intermittently as desired for the purpose of implementing greater number alerting states and a greater number of frequencies which may be confirmed. Further, the LED circuit discussed in detail is applicable not only to a paging receiver but also to a small-size receiver which is powered by a DC power supply for alerting a person to the reception of a signal and other purposes.

Claims

1. A radio paging receiver comprising:

- DC power supply means;
- a coil element;
- a light emitting element circuit comprising a first light emitting element connected at a first terminal to said DC power supply means

and at a second terminal to one end of said coil element, and a second light emitting element connected at a third terminal to the other end of said coil element and at a fourth terminal to ground such that said second light emitting element is identical with said first light emitting element with respect to direction;

first switching means connected between said second terminal and ground;

second switching means connected between said third terminal and said DC power supply means;

radio signal receiving means for receiving a radio signal to produce a receive signal;

memory means for storing first and second paging numbers which are assigned to said paging receiver;

detection means for comparing a receive paging number contained in said receive signal with said first and second paging numbers, if said receive paging number is identical with said first paging number, producing a first detect signal and, if said receive paging number is identical with said second paging number, producing a second detect signal; and

control means for continuously turning on said first switching means and repetitively turning on and off said second switching means in response to said first detect signal and, for repetitively turning on and off said first switching means and continuously turning on said second switching means in response to said second detect signal.

2. A radio paging receiver as claimed in claim 1, wherein each of said first and second light emitting elements comprises a light emitting diode.

3. A radio paging receiver as claimed in claim 1, wherein said first and second switching means comprise an NPN transistor and a PNP transistor, respectively.

4. A radio paging receiver as claimed in claim 1, wherein said DC power supply means comprises a 1-volt battery.

5. A radio paging receiver as claimed in claim 1, further comprising alert means for outputting first and second alert tones in response to said first and second detect signals, respectively, said first and second alert tones being different from each other.

6. A radio paging receiver as claimed in claim 5, wherein said alert means comprises a speaker.

lected with the switch 11 remaining in the frequency confirm mode, only the LED 33 flashes. In this case, signals shown in Fig. 4B are individually outputted via the ports P2-A and P2-B. More specifically, the signal from the port P2-B is changed a low level to a high level to cause a current to flow through the transistor 34. Then, the potential at a point Q of Fig. 3 becomes substantially equal to ground potential. The resulting condition is shown in an equivalent circuit in Fig. 5B. This causes only the LED 33 to flash by exactly the same principle as has been discussed in relation to the LED 32. In this case, the LED 32 does not turn on or flash because no current flows therethrough.

As shown in any of Figs. 4A and 4B, the signal for turning on any of the LED 32 or 33 is fed only after the transistor associated therewith has been fully switched, i.e., a short time lag t_m exists.

In summary, it will be seen that the present invention provides a paging receiver or a small-size receiver having a light emitting element flashing circuit in which a single boosting coil is shared by two light emitting elements and, hence, the number of boosting coils required is only one half the number of LEDs. While a switching circuit implemented as a single package for transistors and a package accommodating a plurality of LEDs are put to practical use today, noticeably reducing the size of a coil is impractical because it has a mechanical structure. In this respect, the decrease in the number of coils attainable with the present invention contributes a great deal to the miniaturization of a small-size receiver.

Various modifications will become possible for those skilled in the art after receiving the teachings of the present disclosure without departing from the scope thereof. For example, while the pulse signal outputted by the control section 4 for flashing the LEDs 32 and 33 is assumed to have a duty of about 50 percent, the duty may be varied to turn on the LEDs 32 and 33 either continuously or intermittently as desired for the purpose of implementing greater number alerting states and a greater number of frequencies which may be confirmed. Further, the LED circuit discussed in detail is applicable not only to a paging receiver but also to a small-size receiver which is powered by a DC power supply for alerting a person to the reception of a signal and other purposes.

Claims

1. A radio paging receiver comprising:
 - DC power supply means;
 - a coil element;
 - a light emitting element circuit comprising a first light emitting element connected at a first terminal to said DC power supply means

and at a second terminal to one end of said coil element, and a second light emitting element connected at a third terminal to the other end of said coil element and at a fourth terminal to ground such that said second light emitting element is identical with said first light emitting element with respect to direction;

first switching means connected between said second terminal and ground;

second switching means connected between said third terminal and said DC power supply means;

radio signal receiving means for receiving a radio signal to produce a receive signal;

memory means for storing first and second paging numbers which are assigned to said paging receiver;

detection means for comparing a receive paging number contained in said receive signal with said first and second paging numbers, if said receive paging number is identical with said first paging number, producing a first detect signal and, if said receive paging number is identical with said second paging number, producing a second detect signal; and

control means for continuously turning on said first switching means and repetitively turning on and off said second switching means in response to said first detect signal and, for repetitively turning on and off said first switching means and continuously turning on said second switching means in response to said second detect signal.

2. A radio paging receiver as claimed in claim 1, wherein each of said first and second light emitting elements comprises a light emitting diode.
3. A radio paging receiver as claimed in claim 1, wherein said first and second switching means comprise an NPN transistor and a PNP transistor, respectively.
4. A radio paging receiver as claimed in claim 1, wherein said DC power supply means comprises a 1-volt battery.
5. A radio paging receiver as claimed in claim 1, further comprising alert means for outputting first and second alert tones in response to said first and second detect signals, respectively, said first and second alert tones being different from each other.
6. A radio paging receiver as claimed in claim 5, wherein said alert means comprises a speaker.



7. A radio paging receiver as claimed in claim 5, further comprising means for suspending the operation of said alert means.
8. A radio paging receiver as claimed in claim 7, further comprising:
 receive frequency setting means for setting said radio signal receiving means at a predetermined receive frequency; and
 means responsive to the suspension of said alert means for continuously turning on one of said first and second switching means and repetitively turning on and off the other of said first and second switching means on the basis of said predetermined receive frequency.
9. A small-size receiver comprising:
 DC power supply means;
 a coil element;
 receiving means for receiving signals to produce a first and a second receive signal;
 flashing circuit means including a first light emitting element which is connected at a first terminal to said DC power supply means and at a second terminal to one end of said coil element such that said first light emitting element is opposite to a voltage applied from said DC power source with respect to a direction, and a second light emitting element connected at a third terminal to the other end of said coil element and at a fourth terminal to ground such that said second light emitting element is identical with said first light emitting element with respect to direction;
 first switching means connected between said second terminal and ground, repetitively turning on and off in response to a first control signal, and continuously turning on in response to a second control signal;
 second switching means connected between said third terminal and said power supply means, repetitively turning on and off in response to a third control signal, and continuously turning on in response to a fourth control signal; and
 control means for producing, in response to said first receive signal, said second and third control signals, for supplying them to said first and second switching means, respectively, for producing, in response to said second receive signal, said first and fourth control signals, and for supplying them to said first and second switching means, respectively.
10. A receiver as claimed in claim 9, wherein said first and second light emitting elements each comprises a light emitting diode.

11. A receiver as claimed in claim 10, wherein said first and second switching means comprise an NPN transistor and a PNP transistor, respectively.

12. A receiver as claimed in claim 9, wherein said DC power supply means comprises a 1-volt battery.

Patentansprüche

1. Personenrufempfänger mit einer Gleichstromversorgungseinrichtung, einem Wicklungselement, einem Leuchtdiodenschaltkreis mit einem ersten lichtemittierenden Element, das mit einem ersten Anschluß an der Gleichstromversorgungseinrichtung und mit einem zweiten Anschluß an einem Ende des Wicklungselementes angeschlossen ist und einem zweiten lichtemittierenden Element, das mit einem dritten Anschluß am anderen Ende des Wicklungselementes angeschlossen und mit einem vierten Anschluß an Masse gelegt ist, so daß das zweite lichtemittierende Element in Bezug auf die Richtung identisch mit dem ersten lichtemittierenden Element ist,
 einer ersten Schalteinrichtung, die zwischen dem zweiten Anschluß und der Masse angeschlossen ist,
 einer zweiten Schalteinrichtung, die zwischen dem dritten Anschluß und der Gleichstromversorgungseinrichtung angeschlossen ist,
 einer Funksignalempfangseinrichtung zum Empfangen eines Funksignals und Erzeugen eines Empfangssignals,
 einer Speichereinrichtung zur Einspeicherung von ersten und zweiten Personenrufnummern, die dem Personenrufempfänger zugeordnet sind,
 einer Erkennungseinrichtung zum Vergleichen einer im Empfangssignal enthaltenen, empfangenen Personenrufnummer mit den ersten und zweiten Personenrufnummern und Erzeugen eines ersten Erkennungssignales, wenn die empfangene Personenrufnummer mit der ersten Personenrufnummer identisch ist, und Erzeugen eines zweiten Erkennungssignales, wenn die empfangene Personenrufnummer mit der zweiten Personenrufnummer identisch ist, und
 einer Steuereinrichtung zum andauernden Einschalten der ersten Schalteinrichtung und wiederholtem Ein- und Ausschalten der zweiten Schalteinrichtung auf das erste Erkennungssignal hin und zum wiederholten Ein- und Ausschalten der ersten Schalteinrichtung und andauerndem Einschalten der zweiten Schalteinrichtung auf das zweite Erkennungssignal hin.



2. Personenrufempfänger nach Anspruch 1, wobei jedes der ersten und zweiten lichtemittierenden Elemente eine Leuchtdiode aufweist.
3. Personenrufempfänger nach Anspruch 1, wobei die erste und die zweite Schalteinrichtung einen NPN-Transistor bzw. einen PNP-Transistor aufweist.
4. Personenrufempfänger nach Anspruch 1, wobei die Gleichstromversorgungseinrichtung eine 1-Volt-Batterie aufweist.
5. Personenrufempfänger nach Anspruch 1, ferner mit einer Alarmeinrichtung zum Abgeben erster und zweiter Alarmtöne auf das erste bzw. zweite Erkennungssignal hin, wobei sich die ersten und zweiten Alarmtöne voneinander unterscheiden.
6. Personenrufempfänger nach Anspruch 5, wobei die Alarmeinrichtung einen Lautsprecher aufweist.
7. Personenrufempfänger nach Anspruch 5, ferner mit einer Einrichtung zum Außerbetriebsetzen der Alarmeinrichtung.
8. Personenrufempfänger nach Anspruch 7, ferner mit einer Empfangsfrequenzeinstelleinrichtung zum Einstellen der Funksignalempfangseinrichtung auf eine bestimmte Empfangsfrequenz und einer Einrichtung, die auf das Außerbetriebsetzen der Alarmeinrichtung hin auf der Basis der bestimmten Empfangsfrequenz eine der ersten und zweiten Schalteinrichtungen andauernd einschaltet und die andere der ersten und zweiten Schalteinrichtungen wiederholt ein- und ausschaltet.
9. Kleinempfänger mit einer Gleichstromversorgungseinrichtung, einem Wicklungselement, einer Empfangseinrichtung zum Empfangen von Signalen, die ein erstes und zweites Empfangssignal erzeugen, einer Blinkschaltung, die ein erstes lichtemittierendes Element enthält, das mit einem ersten Anschluß an der Gleichstromversorgungseinrichtung und mit einem zweiten Anschluß an einem Ende des Wicklungselementes angeschlossen ist, so daß das erste lichtemittierende Element zu einer von der Gleichstromversorgungseinrichtung angelegten Spannung in Bezug auf die Richtung entgegengesetzt ist, und ein zweites lichtemittierendes Element, das mit einem dritten Anschluß am anderen Ende des Wicklungselementes angeschlossen und mit einem vierten Anschluß an Masse ge-

legt ist, so daß das zweite lichtemittierende Element in Bezug auf die Richtung identisch mit dem ersten lichtemittierenden Element ist, einer ersten Schalteinrichtung, die zwischen dem zweiten Anschluß und der Masse angeschlossen ist, auf ein erstes Steuersignal hin wiederholt ein- und ausschaltet und auf ein zweites Steuersignal hin andauernd eingeschaltet ist,

einer zweiten Schalteinrichtung, die zwischen dem dritten Anschluß und der Energieversorgungseinrichtung angeschlossen ist, auf ein drittes Steuersignal hin wiederholt ein- und ausschaltet und auf ein viertes Steuersignal hin andauernd eingeschaltet ist, und einer Steuerungseinrichtung zur Erzeugung des zweiten und dritten Steuersignals auf das erste Empfangssignal hin und deren Zuleitung zur ersten bzw. zweiten Schalteinrichtung und zur Erzeugung des ersten und vierten Steuersignals auf das zweite Empfangssignal hin und deren Zuleitung zur ersten bzw. zweiten Schalteinrichtung.

10. Empfänger nach Anspruch 9, wobei jedes der ersten und zweiten lichtemittierenden Elemente eine Leuchtdiode aufweist.

11. Empfänger nach Anspruch 10, wobei die erste bzw. zweite Schalteinrichtung einen NPN-Transistor bzw. PNP-Transistor aufweist.

12. Empfänger nach Anspruch 9, wobei die Gleichstromversorgungseinrichtung eine 1-Volt-Batterie aufweist.

Revendications

1. Radio récepteur d'appel de personnes comprenant :

un moyen d'alimentation en courant continu ;

un élément de bobine ;

un circuit d'éléments émettant de la lumière comprenant un premier élément émettant de la lumière relié à une première borne au moyen d'alimentation en courant continu et à une seconde borne à une extrémité d'élément de bobine, et un second élément émettant de la lumière relié à une troisième borne à l'autre extrémité d'élément de bobine et à une quatrième borne à la masse, de sorte que le second élément émettant de la lumière est identique au premier élément émettant de la lumière par rapport à la direction ;

un premier moyen de commutation relié entre la seconde borne et la masse ;

un second moyen de commutation relié entre la troisième borne et le moyen d'alimen-





tation en courant continu ;

un moyen de réception de signal radio pour recevoir un signal radio afin de produire un signal de réception ;

un moyen de mémoire pour mémoriser des premier et second numéros d'appel qui sont affectés au radio récepteur d'appel ;

un moyen de détection pour comparer un numéro d'appel reçu contenu dans le signal de réception au premier et second numéros d'appel, et si le numéro d'appel reçu est identique au premier numéro d'appel, produire un premier signal de détection et, si le numéro d'appel reçu est identique au second numéro d'appel, produire un second signal de détection ; et

un moyen de commande pour activer continuellement le premier moyen de commutation et activer et désactiver de manière répétée le second moyen de commutation en réponse au premier signal de détection et pour, activer et désactiver de manière répétée le premier moyen de commutation et activer continuellement le second moyen de commutation en réponse au second signal de détection.

2. Radio récepteur d'appel de personnes selon la revendication 1, dans lequel chacune des premier et second éléments émettant de la lumière comprend une diode électroluminescente.

3. Radio récepteur d'appel de personnes selon la revendication 1, dans lequel les premier et second moyens de commutation comprennent un transistor NPN et un transistor PNP, respectivement.

4. Radio récepteur d'appel de personnes selon la revendication 1, dans lequel le moyen d'alimentation en courant continu comprend une pile ou batterie de 1 volt.

5. Radio récepteur d'appel de personnes selon la revendication 1, comprenant de plus un moyen d'avertissement pour sortir des première et seconde tonalités d'avertissement en réponse aux premier et second signes de détection, respectivement, les première et seconde tonalités d'avertissement étant différentes l'une de l'autre.

6. Radio récepteur d'appel de personnes selon la revendication 5, dans lequel le moyen d'avertissement comprend un haut-parleur.

7. Radio récepteur d'appel de personnes selon la revendication 5, comprenant de plus un moyen pour suspendre le fonctionnement du moyen

d'avertissement.

8. Radio récepteur d'appel de personnes selon la revendication 7, comprenant de plus :

un moyen de réglage de fréquence de réception pour régler le moyen de réception du signal radio à une fréquence de réception prédéterminée, et

un moyen répondant à la suspension du moyen d'avertissement pour activer continuellement l'un des premier et second moyens de commutation et activer et désactiver de manière répétée l'autre des premier et second moyens de commutation sur la base de la fréquence de réception prédéterminée.

9. Radio récepteur compact comprenant :

un moyen d'alimentation en courant continu ;

un élément de bobine ;

un moyen de réception pour recevoir les signaux afin de produire des premier et second signaux de réception ;

un moyen de circuit de clignotement comportant un premier élément émettant de la lumière qui est relié à une première borne au moyen d'alimentation en courant continu et à une seconde borne à une extrémité de l'élément de bobine de sorte que le premier élément émettant de la lumière est d'une tension opposée à celle qui est appliquée à partir de la source d'alimentation en courant continu par rapport à une direction, et un second élément émetteur de lumière reliée à une troisième borne à l'autre extrémité de l'élément de bobine et à une quatrième borne à la masse de sorte que le second élément émetteur de lumière est identique au premier élément émetteur de lumière par rapport à la direction ;

un premier moyen de commutation connecté entre la seconde borne et la masse, étant activé et désactivé de manière répétée en réponse à un premier signal de commande, et étant activé en continu en réponse à un second signal de commande ;

un second moyen de commutation connecté entre la troisième borne et le moyen d'alimentation, étant activé et désactivé de manière répétée en réponse à un troisième signal de commande, et étant activé en continu en réponse à un quatrième signal de commande ; et

un moyen de commande pour produire, en réponse au premier signal de réception, les second et troisième signaux de commande, pour les délivrer au premier et second moyens de commutation, respectivement, afin de produire, en réponse au second signal de récep-

tion, les premier et quatrième signaux de commande, pour les appliquer ensuite aux premier et second moyens de commutation, respectivement.



10. Un récepteur selon la revendication 9, dans lequel les premier et second élément émetteur de lumière comprennent chacun une diode électroluminescente.

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11. Un récepteur selon la revendication 10, dans lequel les premier et second moyens de commutation comprennent un transistor NPN et un transistor PNP, respectivement.

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12. Un récepteur selon la revendication 9, dans lequel le moyen d'alimentation en courant continu comprend une pile ou batterie de 1 volt.

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