United States Patent [19]

Radford

[11] **3,909,819**

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[54] **MAILBOX ALARM**

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[52] **U.S. Cl.** **340/281;** 250/215; 340/274

[51] **Int. Cl.**[2] **G08B 21/00**

[58] **Field of Search** 340/281; 250/239, 215

[56] **References Cited**

UNITED STATES PATENTS

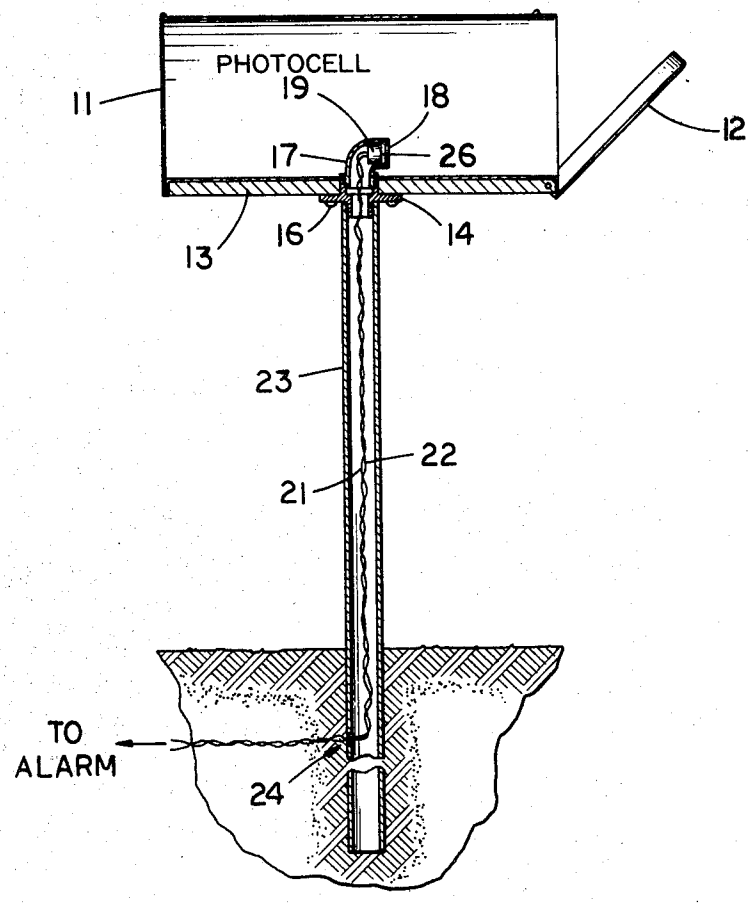
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Primary Examiner—Thomas B. Habecker
Attorney, Agent, or Firm—Woodard, Weikart, Emhardt & Naughton

[57] **ABSTRACT**

Alarm apparatus for indicating when mail has been delivered to a mailbox. A photocell inside the mailbox has an electrical characteristic dependent upon the presence of light in the mailbox, and this electrical characteristic is coupled to an alarm signal device inside a house. The alarm signal device latches on after mail has been delivered and light has entered the mailbox changing the electrical characteristic of the photocell.

10 Claims, 2 Drawing Figures



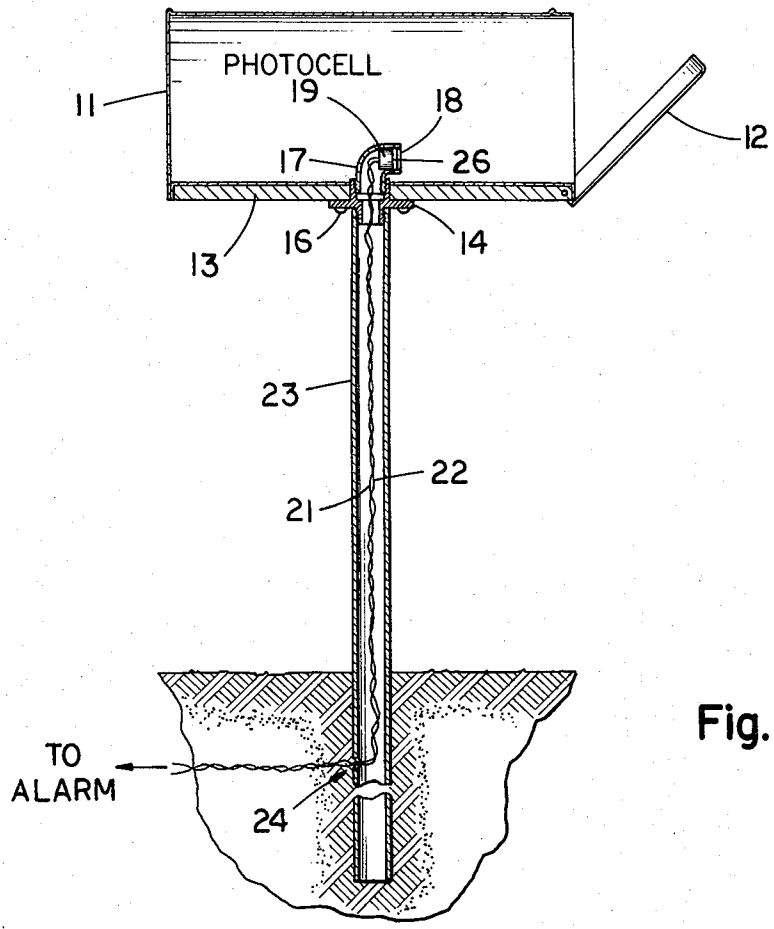

PHOTOCELL
11
19
18
12
17
26
13
16
14
23
22
21
TO
ALARM
24

Fig. 1

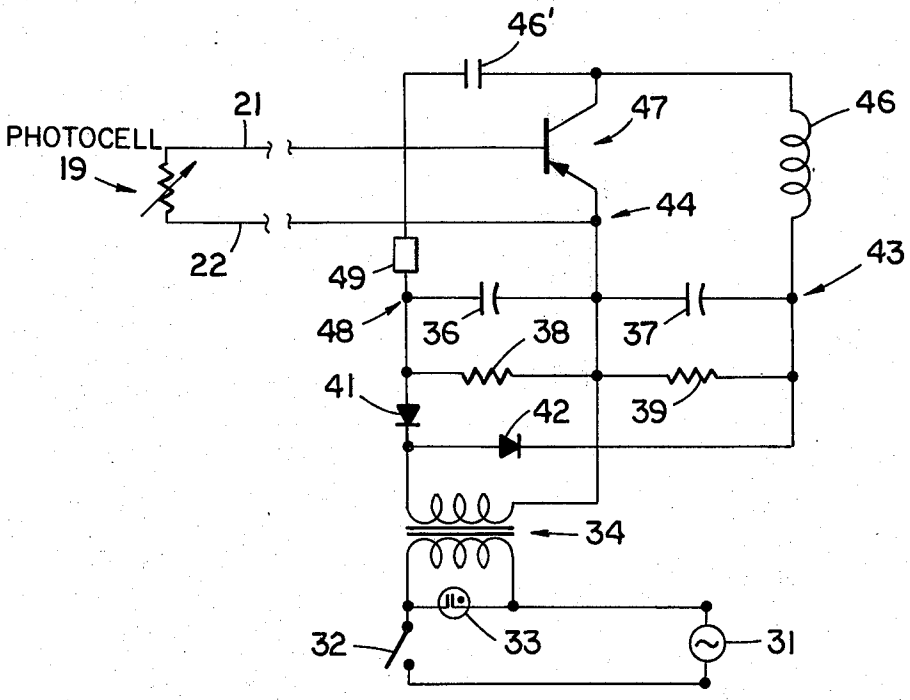

46'
21
PHOTOCELL
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34
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31

Fig. 2

MAILBOX ALARM

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention is in the field of mailbox signaling devices.

2. Description of the Prior Art

In the past, various mechanical and electromechanical devices have been proposed for indicating when mail has been delivered to a rural mailbox, which is typically along a road some distance from the house of the persons to receive the mail. The mechanical devices suffer from the drawback that mechanical parts may wear out, rust or corrode. Further, mechanical devices typically depend upon the occupant of the home to be able to view a flag or other mechanical indicator mounted on the mailbox, which is not always practical. Also, mechanical devices for indicating that mail has been delivered must be designed so that they do not interfere with or possibly pose the possibility of injury to the mail carrier delivering the mail, and this limitation limits the available mechanical designs. Similar mechanical problems, at least in part, are encountered when utilizing electromechanical devices to indicate when mail has been delivered to a rural mailbox.

Some of the devices, different from that presently disclosed, for indicating the delivery of mail to a rural-type mailbox are disclosed in the following U.S. Patents: No. 3,222,665 to Tracy, No. 3,572,581 to McLeod, No. 3,040,141 to Whilden et al., No. 3,009,139 to Hill and No. 3,318,516 to Scheerer.

SUMMARY OF THE INVENTION

An embodiment of the present invention is a mailbox alarm apparatus comprising an enclosed mailbox having an openable door and photosensitive means for initiating an alarm signal in response to the presence of light in the mailbox when the door is opened.

It is an object of the present invention to provide a simple and reliable, non-mechanical, mailbox alarm signal device.

Further objects and advantages of the present invention shall be apparent from the following detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG 1 is a cross-sectional view of mailbox apparatus embodying the present invention.

FIG. 2 is a schematic diagram of an alarm assembly used with the apparatus of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

For the purposes of promoting an understanding of the principles of the invention, reference will now be made to the embodiment illustrated in the drawings and specific language will be used to describe the same. It will nevertheless be understood that no limitation of the scope of the invention is thereby intended, such alterations and further modifications in the illustrated device, and such further applications of the principles of the invention as illustrated therein being contemplated as would normally occur to one skilled in the art to which the invention relates.

Referring in particular to FiG. 1, there is illustrated a mailbox 11 having a door 12 hingedly attached to facilitate the insertion and removal of mail from box 11.

Rigidly attached beneath mailbox 11 is board 13 forming a base member for the box. Collar 14 is attached beneath box 11 to board 13 using conventional fasteners such as bolts 16. The neck of collar 14 extends upwardly through a hole in the bottom of box 11 and board 13 and the neck of collar 14 also extends downwardly. The inside of the neck of collar 14 is threaded as is the outside of the neck on its downwardly extending portion.

Mounted within mailbox 11 is housing 17 which has a downwardly extending portion threaded about the outside which is engaged within the threaded inside portion of the neck of collar 14. A transparent lens 18 is mounted across the opening of the horizontally extending portion of housing 17. Force fit within housing 17 and facing in a horizontal direction through lens 18 toward door 12 in mailbox 11 is photocell 19, which is not shown in cross section in FIG. 1. Leads 21 and 22 extend from the rear portion of the photocell 19 and exit through the opening in the bottom of housing 17.

Hollow pipe 23 is embedded in the ground at its lower end, preferably in a cement block (not shown), and at its top end has interior threads which are received by the threads on the outside off the downwardly extending portion of the neck of collar 14. Pipe 23 serves as a support for mailbox 11 and also provides a path for wires 21 and 22 to be placed beneath the ground. A hole 24 is provided several inches below the ground in pipe 23 so that wires 21 and 22 may be fed downwardly from the bottom of housing 17 through pipe 23 and out hole 24 into the ground.

After wires 21 and 22 exit into the ground from pipe 23, they proceed under the ground to an alarm signal apparatus at a location such as within the home of persons receiving mail in mailbox 11. Wires 21 and 22 are insulated with a material resistant to corrosion to prevent a short circuit between the wires and to resist the action of water along the portion which is placed beneath the ground.

Light sensitive surface 26 of photocell 19 faces in the direction of door 12 of mailbox 11 so that when door 12 is open light external to the mailbox, entering the mailbox, will be incident upon light sensitive surface 26. Photocell 19 is a cadmium-sulfide cell which has a resistance in the dark in the order of 200,000 ohms and in indirect daytime sunlight on the order of 60 ohms. This variable, light dependent, resistance is presented across the terminals of the photocell 19 which are connected to leads 21 and 22.

Referring now to FiG. 2, there is shown a schematic diagram for an alarm assembly according to the present invention. Cadmium-sulfide cell 19 in mailbox 11 is shown schematically as 19 in FIG. 2. Standard AC power source 31 provides power for the alarm through switch 32. Lamp 33 is across the line to indicate when power is on, and transformer 34 steps down the input voltage and provides isolation for the rest of the circuitry. Capacitors 36 and 37, resistors 38 and 39, and diodes 41 and 42 comprise a voltage doubler and 2-level power supply circuit.

Transistor 47 is provided as a switch to connect the power supply level at point 44 with the power supply level at point 43 through relay coil 46. Transistor 47 is biased off in the condition in which the interior of mailbox 11 is dark and photocell 19 presents a resistance of about 200,000 ohms at its output terminals. Photocell 19 is connected across the base and emitter of tran-

sistor **47**. When light is incident upon light sensitive surface **26** of photocell **19**, the resistance presented by the photocell lowers markedly to a resistance in the order of 60 ohms, which turns on transistor **47** and causes current to flow through relay **46** from point **43** of the power supply to point **44**. The current flow through the control windeing **46** of the relay causes normally open contacts **46'** of the relay to close, and current is then drawn from point **43** of the power supply to point **48** through relay coil **46**, the now closed contacts **46'**, and signal device **49**. Relay **46–46'** is now latched on regardless of the biasing of transistor **47** since there is now a current path across the entire power supply rather than through transistor **47** to the power supply intermediate level at point **44**.

Typically, once mail has been placed in mailbox **11** and signal device **49** has been activated as outlined above, door **12** will be closed and the resistance value presented by photocell **19** will return to a value in the order of 200,000 ohms and transistor **47** will be biased off. Meanwhile, the current through signal device **49** will continue through relay **46–46'** until power switch **32** is thrown to turn off or reset the alarm. Signal device **49** may be a lamp or an audio alarm or other desired signaling means.

It can be seen that there has been described a mailbox alarm which is simple, reliable, and non-mechanical.

While there have been described above the principles of this invention in connection with specific apparatus, it is to be clearly understood that this description is made only by way of example and not as a limitation in the scope of the invention.

The invention claimed is:

1. Mailbox alarm apparatus comprising: an enclosed mailbox having an openable door; and photosensitive means for initiating activation of an alarm signal in response to light coming from outside the mailbox when the door is opened.

2. The apparatus of claim **1** in which the photosensitive means includes:

first means inside the mailbox when the door is closed for presenting at an output an electrical characteristic dependent upon the presence of light in the mailbox; and

second means for coupling the output of the first means to an alarm signal assembly.

3. The apparatus of claim **2** in which the first means includes a photocell presenting a light-dependent resistance at an output.

4. The apparatus of claim **3** in which the photocell is a cadmium-sulfide cell.

5. The apparatus of claim **2** which further includes:

an alarm signal assembly coupled to the output of the first means by the second means.

6. The apparatus of claim **5** in which the alarm signal assembly comprises:

a power supply;

an alarm signal device having a first terminal coupled to the power supply at a first point and having a second terminal; and

switch means coupled between the second terminal of the alarm signal device and the power supply at a point of electrical potential different from that of the first point, for coupling the second terminal of the alarm signal device to the power supply when the output of the first means corresponds to a first condition when light is present in the mailbox.

7. The apparatus of claim **6** in which the second means is a pair of wires.

8. The apparatus of claim **6** in which the alarm signal device is a light and which further includes latching means for maintaining the second terminal of the light coupled to the power supply after the first condition arises.

9. The apparatus of claim **5** in which the alarm signal assembly comprises:

a power supply;

an audible alarm having a first terminal coupled to the power supply at a first point and having a second terminal; and

switch means, coupled between the second terminal of the audible alarm and the power supply at a point of electrical potential different from that of the first point, for coupling the second terminal of the audible alarm to the power supply when the output of the first means corresponds to a first condition when light is present in the mailbox.

10. The mailbox alarm apparatus of claim **1** which additionally includes:

latch means for maintaining activation of said alarm signal after said photosensitive means initiates and after light ceases coming into the mailbox from outside the mailbox whereby after the door is closed the alarm signal remains activated.

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