

Joens et al.

[15] **3,668,675**

[45] **June 6, 1972**

[54] REMOTE ALARM SYSTEM

[72] Inventors: **Allan D. Joens**, 8115 Clinton Ave., Minneapolis, Minn. 55420; **Robert W. Johnson**, 5452 Nokomis Ave., Minneapolis, Minn. 55417; **Michael Riggle**, 1232 Oakmont Dr., Temperance, Mich. 48182

[22] Filed: **Apr. 3, 1970**

[21] Appl. No.: 25,330

[52] U.S. Cl.....**340/224**, 307/293, 325/117,
340/65, 340/261, 340/262

[51] Int. Cl. H04b 7/00, G08b 13/00, B60r 25/10

[58] **Field of Search**.....340/224, 276, 63, 64, 65, 261;
307/293; 325/111, 116

[56] **References Cited**

UNITED STATES PATENTS

1,230,787	6/1917	Robison et al.	340/63 X
2,344,014	3/1944	Allison	340/261 UX

2,892,181	6/1959	Benson et al.....	340/63 X
2,984,820	5/1961	Kennell.....	340/63 X
3,056,951	10/1962	Tooni.....	340/224
3,179,818	4/1965	Urban.....	307/293
3,192,517	6/1965	Werlin.....	340/276
3,200,393	8/1965	Worley.....	340/276
3,422,398	1/1969	Rubin.....	340/276 X
3,531,793	9/1970	Shottenfeld.....	340/63 X
3,480,942	11/1969	Hirschberg.....	340/261

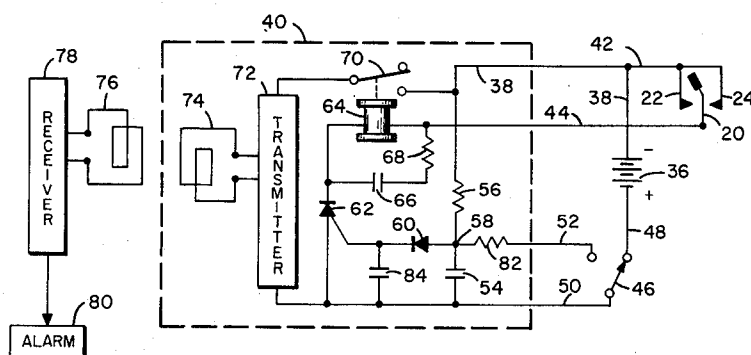
Primary Examiner—David L. Trafton

Attorney—Robert M. Dunning

[57] **ABSTRACT**

A vehicle alarm system is disclosed which incorporates an acceleration-sensitive pendulum connected to a relay operated radio transmitter so as to signal silently to a remote station any movement of the vehicle on which the apparatus is magnetically mounted. A charge storage circuit in parallel with the relay keeps the transmitter on for about a 1 second interval.

9 Claims, 2 Drawing Figures



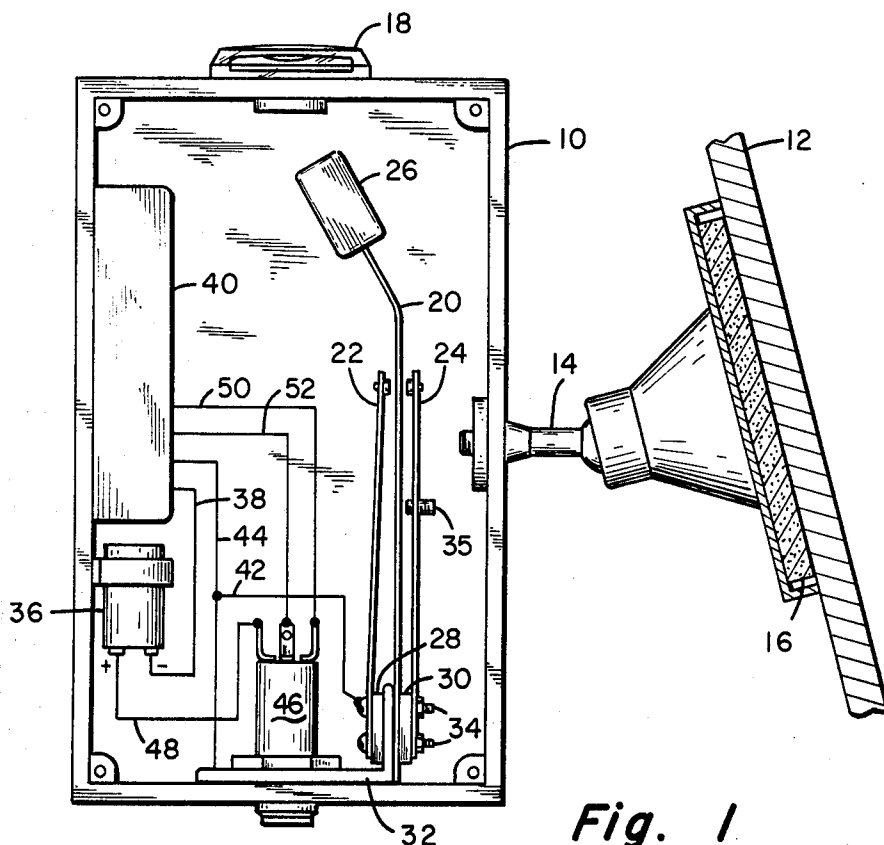


Fig. 1

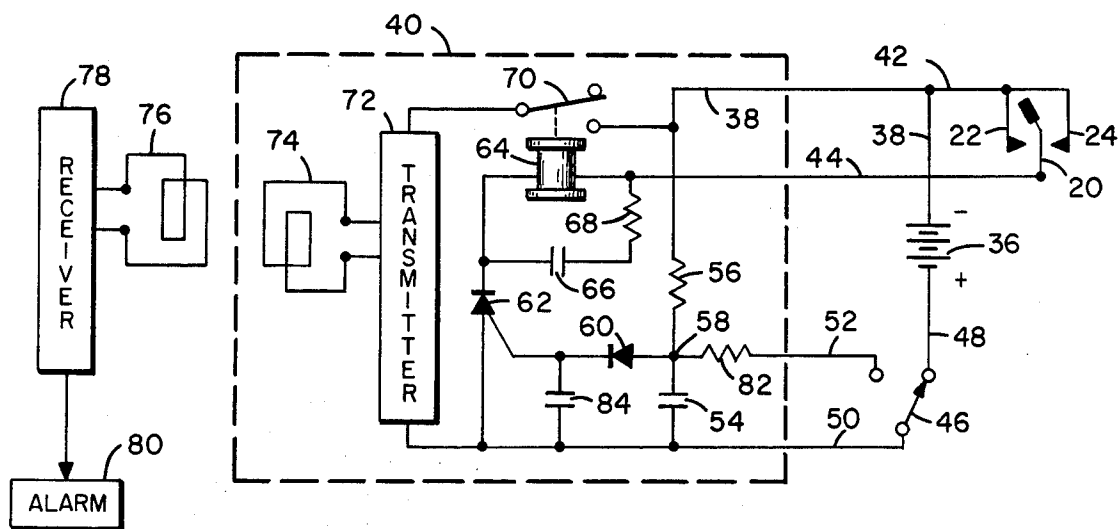


Fig. 2

INVENTORS
ALLAN D. JOENS
MICHAEL RIGGLE
ROBERT W. JOHNSON

BY

Robert M. Dunning
ATTORNEY

REMOTE ALARM SYSTEM

BACKGROUND OF THE INVENTION

In prior art vehicle theft alarms, a need has long existed for a portable alarm system which can be used to guard a variety of vehicles under diverse conditions without requiring any installation activities. For example, at a truck loading dock a number of different types of vehicles may be present at any given time. These trucks may have to be left overnight requiring constant surveillance of the partially loaded or unloaded cargoes. Unfortunately, no prior art alarm systems are available which can be quickly attached to any type of vehicle and monitored remotely at a single guard station. The present invention provides such an alarm system permitting for the first time a single station remote surveillance system which can monitor a very large number of totally different types of vehicles simultaneously.

SUMMARY OF THE INVENTION

Briefly, our invention utilizes an acceleration-sensitive pendulum switch connected to a relay which operates to activate a radio transmitter upon receiving a movement-triggered signal from the pendulum switch. A central radio receiver station is used to monitor one or more of these units. The alarm unit can monitor nearly anything that moves since it is mounted by means of an adjustable ball joint connection and a powerful magnet to any metal surface such as the loading doors or side walls of the truck. A bubble type level is incorporated into the housing of the alarm unit so that the pendulum can be properly centered by leveling the housing. The ball joint allows the unit to be leveled no matter what the orientation of the mounting surface. Since small vibrations from passing traffic and the like may possibly trigger the pendulum switch, it is undesirable to utilize a circuit which will turn on the transmitter permanently since this would require someone to go to the remote unit to reset it. To solve this problem the present invention incorporates a charge-storing circuit parallel to the relay which holds the relay and thus the transmitter on for about a second providing a solid continuous signal. If the truck is being moved, unloaded, or otherwise disturbed the period of the pendulum is such that impulses are repeatedly generated by the pendulum switch at less than one second intervals so that the radio transmitter remains on, signalling a burglary or other serious interference with the monitored vehicles. It is, therefore, an object of the present invention to provide an improved alarm system which is instantly portable allowing monitoring of any movable object on a temporary or permanent basis. Further objects and advantages will become apparent upon consideration of the following description and drawings.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a schematic view of the present inventive alarm showing the pendulum switch, swivel mount, bubble level, and electric circuits.

FIG. 2 is a schematic diagram of the activating and charge-storing circuits.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In FIG. 1 a plastic housing 10 is shown mounted, in a level position, to a surface 12 by a swivel ball joint support 14 which is glued to a magnet 16. In operation the unit is simply placed on any horizontal, vertical, or inclined surface and leveled by means of a transparent bubble level 18 incorporated into housing 10. The leveling insures that a pendulum arm 20 is centered between a pair of contact elements 22 and 24. Arm 20 has a weight 26 at its end of a mass chosen in conjunction with the stiffness of arm 20 to provide the correct oscillatory period. Arms 22 and 24 are mounted on insulating blocks 28 and 30 which rest against a bracket 32. A pair of screws 34 hold arms 20, 22, and 24 and blocks 28 and 30 in place and also provide electrical continuity between arms 22 and 24

without contacting arm 20. Holes in arm 20 provide clearance to screws 34. An adjustment screw 35 in arm 24 may be moved in and out to vary the sensitivity by controlling the width of the gap between contact elements 22 and 24.

The electronic circuits for the activation and storage circuits and the transmitter are incorporated onto circuit boards shown schematically as an electronic package 40 in FIG. 1. A battery 36 provides power directly to the circuits through a lead 38 and indirectly through a lead 42 and a lead 44 by means of the pendulum switch formed by arms 20, 22, and 24 and bracket 32. The unit is activated by turning a key in a switch 46 so as to electrically connect a lead 48 from the positive terminal of battery 36 to a ground lead 50 and disconnect a shorting lead 52 from ground lead 50. This may be better understood by reference to FIG. 2.

In FIG. 2 the electronic circuits are schematically shown retaining the numbering of leads and components employed in FIG. 1. Electronic package 40 is shown in FIG. 2 as the portion contained in dashed line 40. When switch 46 is turned on battery 36 charges up a capacitor 54 through a resistor 56. When capacitor 54 is sufficiently charged the voltage at point 58 raises enough to render a diode 60 conducting. Consequently, a signal is presented to the gate of a silicon controlled rectifier 62 causing rectifier 62 to become conducting. The relay circuit is now sensitive. Any movement of housing 10 causes arm 20 to momentarily contact either arm 22 or 24. A pulse of current flows from battery 36 to a relay 64 and a charge-storing circuit comprising a capacitor 66 and a resistor 68. Relay 64 closes a switch 70 activating a radio transmitter 72 connected to an antenna 74. Even though the connection between arm 20 and the battery is broken relay 64 receives stored current from capacitor 66 for a short while so as to keep switch 70 closed and transmitter 72 activated. In the preferred embodiment the value of capacitor 66 is chosen so as to permit it to supply current for about a one second interval as described earlier. The transmitted radio signal is received at a remote monitoring station by an antenna 76 coupled to a receiver 78 which, if desired, may be connected to trigger an alarm 80. To deactivate the system, switch 46 is rotated to connect leads 50 and 52 together so as to discharge capacitor 54 through a resistor 82. The signal to rectifier 62 ceases thus breaking the relay circuit. A capacitor 84 is utilized in the circuit to prevent erratic switching action in rectifier 62 due to transient voltages generated by the pendulum switch.

I claim

1. A portable alarm system comprising in combination:

a housing adapted to support the alarm system;

means for mounting said housing in a predetermined attitude irrespective of the orientation of the surface to which the housing is mounted;

indicating means on said housing adapted to indicate when said housing is in said predetermined attitude;

an acceleration sensitive switch means in said housing, said switch means resting in a nonconducting position when said housing is in said predetermined attitude;

activation means;

a relay means operable to be activated by said activation means and said switch means;

radio transmitting means adapted to have its output signal modified by said relay means when said relay means is activated;

radio receiving means operable to sense transmissions from said transmitting means and modifications thereof at a remote location; and

charge storage means comprising a capacitor circuit in parallel with said relay means connected to said acceleration sensitive switch means and to said relay means operable to keep said relay means activated for a short interval of duration in the range of about a second upon initial activation by said switch means.

2. The apparatus of claim 1 in which said activation means comprises a diode controlled electronic switching means in se-

3

4

ries with said relay means which diode is controlled by a capacitor charging circuit.

3. The apparatus of claim 2 in which said electronic switching means comprises a silicon controlled rectifier.

4. The apparatus of claim 3 in which said means for mounting comprises a magnetic mount connected to said housing through a swiveling ball joint.

5. The apparatus of claim 4 in which said acceleration sensitive means comprises a weighted, flexible, electrically conducting arm disposed between a pair of electrical contacts.

6. The apparatus of claim 5 in which said indicating means comprises a bubble level in said housing.

7. The apparatus of claim 6 in which said relay means comprises an electromagnetically operated switch, the coil of said switch connected in series with said acceleration sensitive means.

8. The apparatus of claim 7 including a switchable grounding circuit connected to said capacitor charging circuit for preventing activation of said rectifier by said diode.

9. The apparatus of claim 8 including a capacitive coupling to ground from the control input of said rectifier to prevent accidental switching due to transient voltages in the circuits.

* * * * *

15

20

25

30

35

40

45

50

55

60

65

70

75