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Campbell et al.

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[54] **SCENT ALARM DEVICE**

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[51] **Int. Cl.**[5] **G08R 1/00**

[52] **U.S. Cl.** **340/407**; 340/628; 116/214; 222/644; 222/648

[58] **Field of Search** 340/407, 628; 116/214; 222/645, 646, 647, 648, 644; 368/12

[56] **References Cited**

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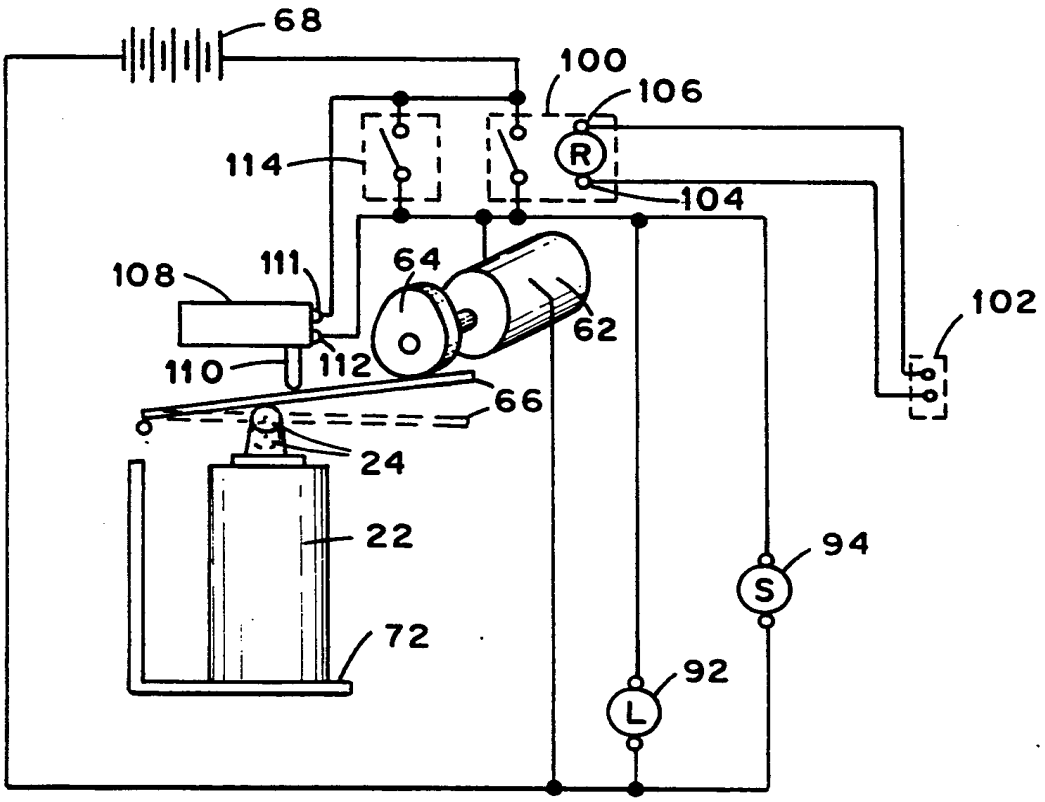
Assistant Examiner—Jeffery A. Hofsass
Attorney, Agent, or Firm—Luedeka, Hodges, Neely, & Graham

[57] **ABSTRACT**

A scent alarm device which includes a housing and a spray canister of an odorant, such as butyl mercaptan, supported within the housing utilizes a mechanism for intermittently dispensing odorant from the canister upon the occurrence of a predetermined event. The spray canister has a depressible release valve for releasing canister contents upon depression of the valve, and the depressing mechanism is adapted to repeatedly depress the canister release valve in an intermittent fashion. The device may utilize a canister having a height within a range of canister heights, and if desired, the device may be interfaced with a number of other alarm systems, such as a smoke or heat detector or used to alert an individual that household electrical power has been shut off.

9 Claims, 3 Drawing Sheets



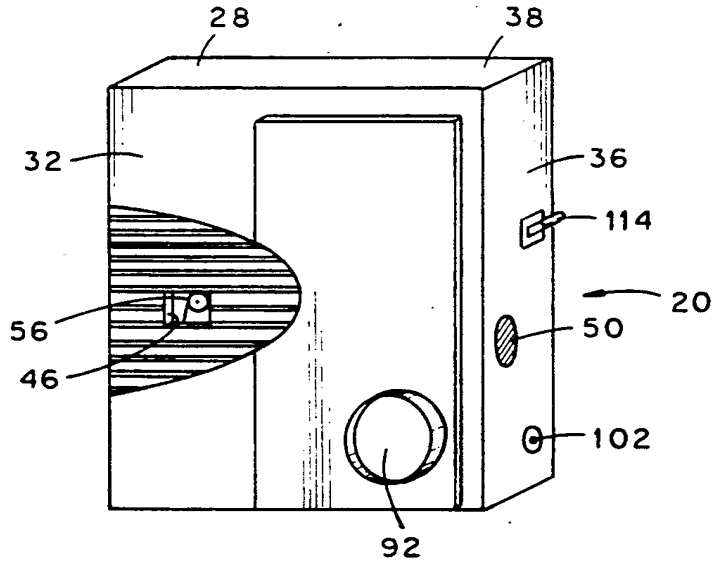

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Fig. 1

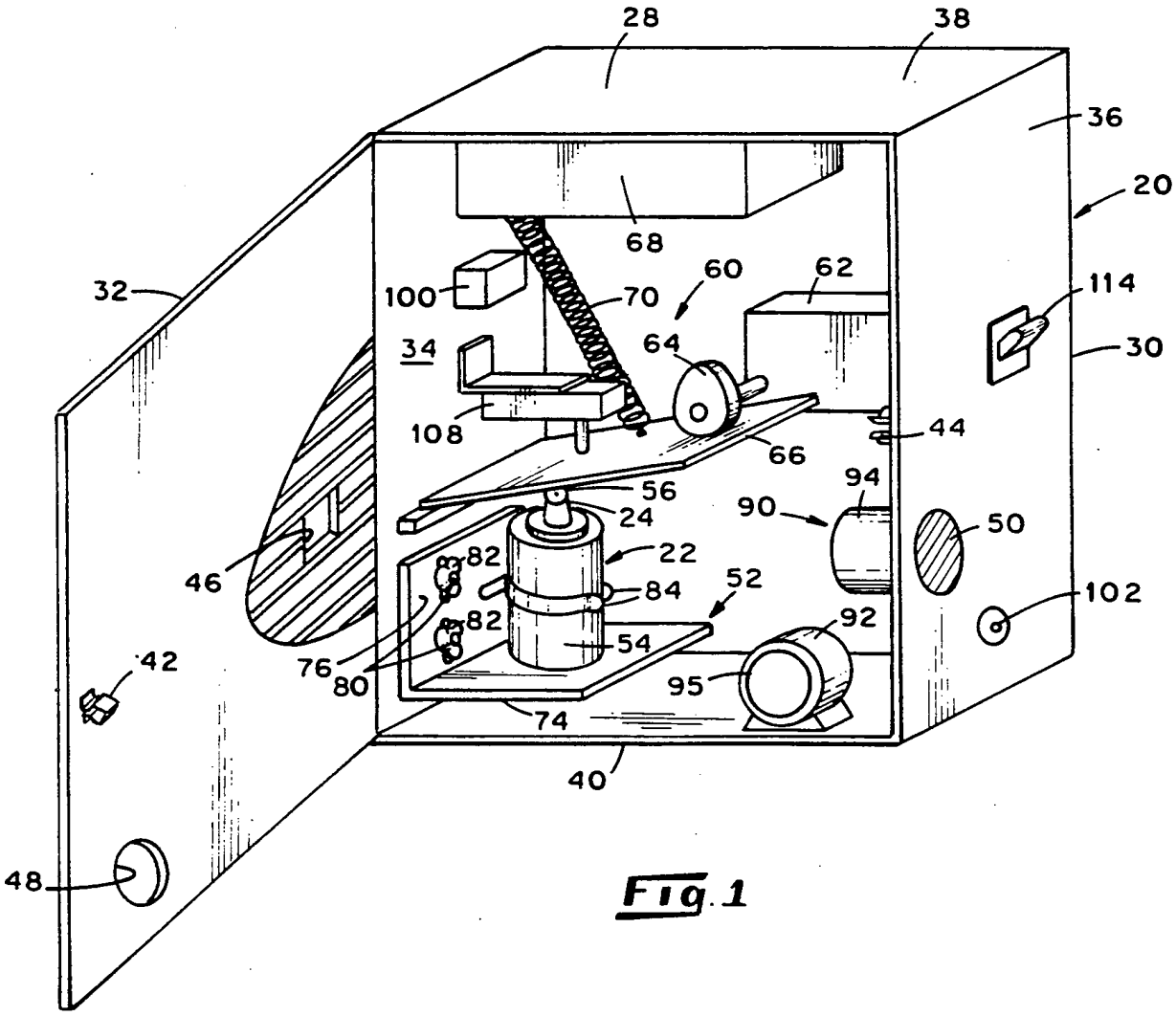
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Fig. 1

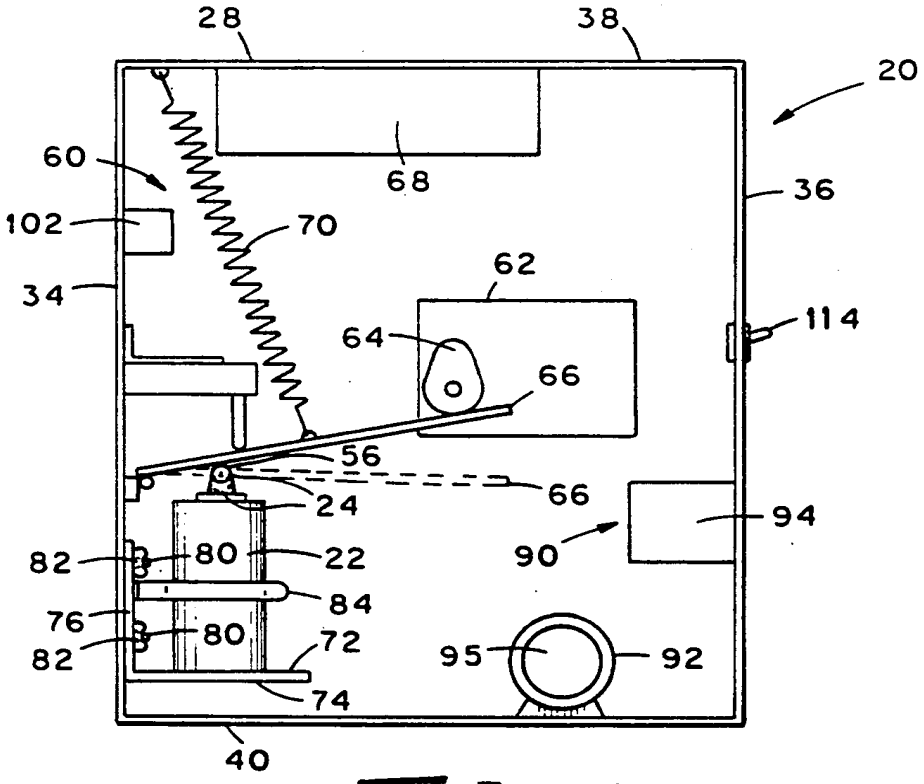
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Fig. 3

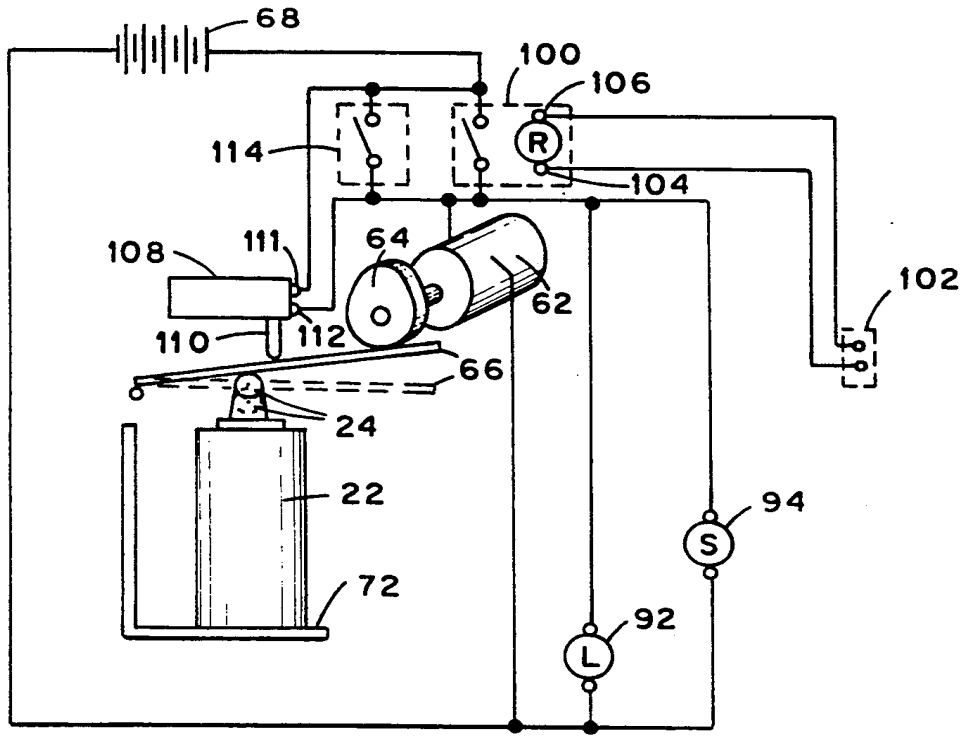
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Fig. 4

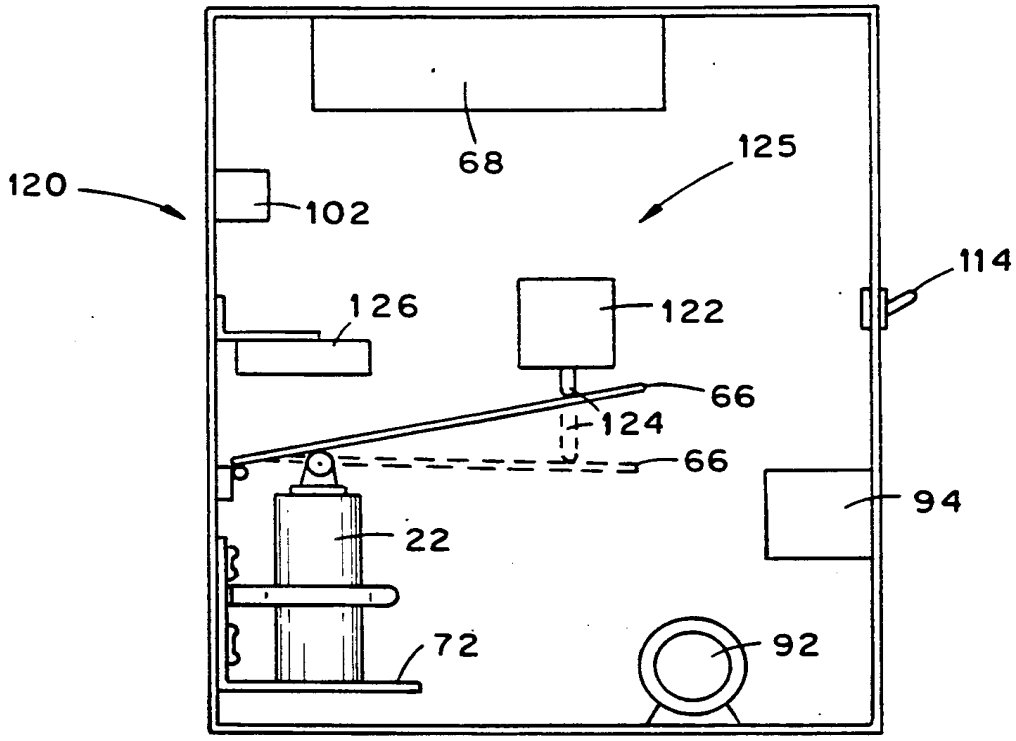
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Fig. 5

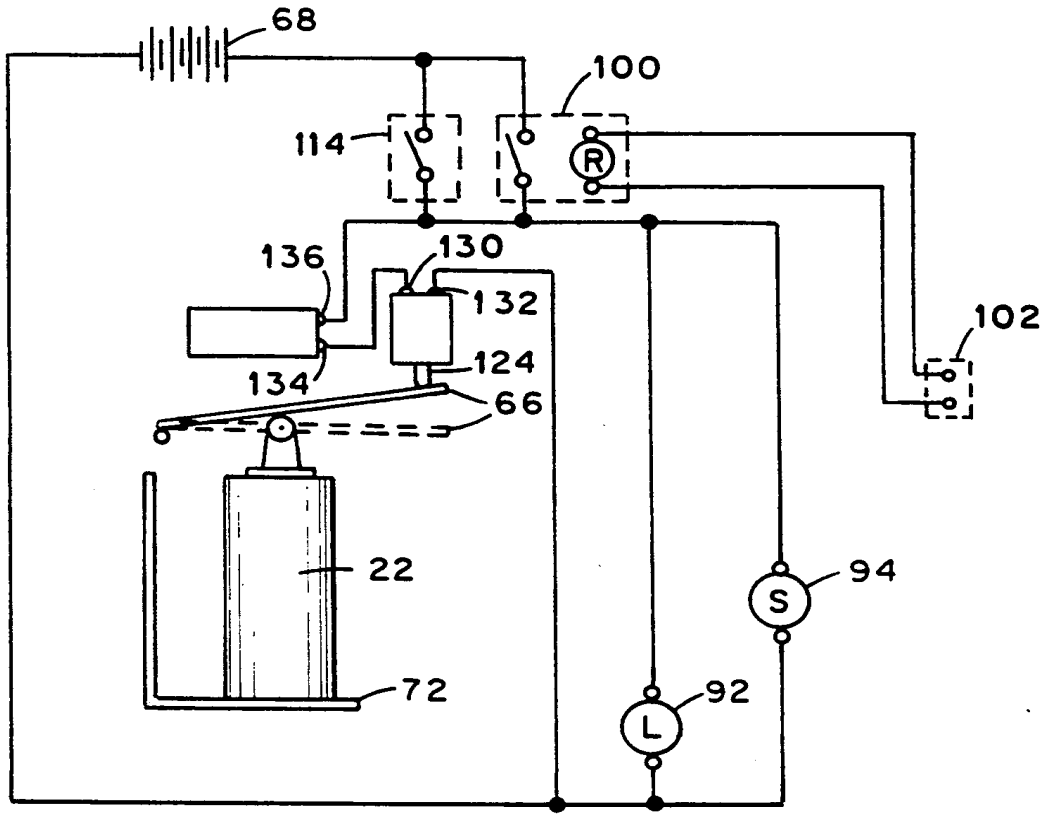
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Fig. 6

SCENT ALARM DEVICE

BACKGROUND AND SUMMARY OF THE INVENTION

This invention relates generally to warning devices and relates, more particularly, to warning devices for emitting an alarm in the form of an odorant.

There exists scent alarm devices for emitting an odorant, such as butyl mercaptan, into breathable air upon the occurrence of a predetermined event. Two such devices which are shown and described in U.S. Pat. Nos. 2,468,369 and 2,894,478 are concerned with stench warning systems utilizing a canister of stench which, when punctured by manually-actuated means, release the contents of the canister into the ventilation or compressed air system of a mine shaft. Another scent alarm device, shown and described in U.S. Pat. No. 4,404,923, utilizes a container of odoriferous fluid which is adapted to break and release its contents upon the exposure to excessive heat, such as may be generated in a fire.

A limitation associated with scent alarm devices such as those of the referenced patents relates to the inability to reuse the devices described therein without replenishing the supply of scent within the system. When, for example, the canister or container of stench is punctured or broken, all of the canister contents are released so that a new canister or container of stench must be installed within the system before the system can be reused.

Accordingly, it is an object of the present invention to provide a new and improved scent alarm device which may be reused many times without the need for re-installing a new odorant-filled canister or container after each use.

Another object of the present invention is to provide such a device which is adapted to utilize a spray canister containing an odorant.

Yet another object of the present invention is to provide such a device wherein the spray canister utilized therewith may possess a height within a broad range of heights.

Still another object of the present invention is to provide such a device which may be readily interfaced with a fire, smoke, heat or other alarm system for actuation of the device when the other system is actuated.

Yet still another object of the present invention is to provide such a device which is particularly well-suited for use in a residence by individuals who are blind, deaf, or hard of hearing.

This invention resides in a scent alarm device comprising a spray canister of an odorant having a depressible release valve for release of canister contents upon the depression of the release valve and means for intermittently depressing the release valve upon the occurrence of a predetermined event so that canister contents are released into the surrounding atmosphere in an intermittent fashion.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of an embodiment of a scent alarm device embodying various features of the present invention.

FIG. **2** is a view similar to that of FIG. **1** of the FIG. **1** device wherein the front access door of the device is shown in an opened position.

FIG. **3** is a front elevational view of the FIG. **1** device as seen through its front, when opened.

FIG. **4** is a wiring schematic of the FIG. **1** device.

FIG. **5** is a view similar to that of FIG. **3** of another embodiment of a scent alarm device embodying various features of the present invention.

FIG. **6** is a wiring schematic of the FIG. **5** device.

DETAILED DESCRIPTION OF THE ILLUSTRATED EMBODIMENTS

Turning now to the drawings in greater detail, there is illustrated in FIGS. **1** and **2** a scent alarm device, indicated **20**, within which features of the present invention are embodied. The device **20** includes a spray canister **22** of an odorant, such as butyl mercaptan, having a depressible release valve **24** for releasing contents of the canister **22** upon the occurrence of a predetermined event. As will be apparent herein, the spray canister **22** may be in the form of a canister containing contents under pressure or a pump-type canister whose contents are dispensed from the valve **24** by repeatedly moving the valve **24** between depressed and extended positions.

The device **20** may be used in any of a number of applications to alert or warn an individual of the occurrence of a predetermined event. The device **20** may, for example, be interfaced with a smoke or heat detector to warn or alert an individual that the smoke or heat detector has been activated, with appropriate temperature sensors for indicating that a room has reached a temperature level which is either too cold or too hot, with an appropriate electrical sensor for indicating that household electrical power has been shut off, or with a burglar alarm for indicating that the burglar alarm has been activated. The depicted device **20** is adapted to be energized upon the energizing of an electrical circuit with which the device **20** is interfaced, but it is to be understood that the principles of the invention can be variously applied.

The device **20** includes a housing **28** having a back **30**, a front **32**, two opposite sides **34**, **36**, a top **38** and a bottom **40**. The front **32** is hingedly connected to an edge of the side **34** for movement between a closed position as illustrated in FIG. **1** and an open position as illustrated in FIG. **2**. A tab member **42** is affixed to the front **32** in the manner illustrated in FIG. **2** and cooperates with a corresponding fastener member **44** affixed to the housing side **36** for releasably securing the front **32** in its FIG. **1** closed position.

The front **32** also includes a vent passage **46** which, when the front **32** is in a closed position, permits communication between the interior and the exterior of the housing **28**. As will be apparent herein, the vent passage **46** permits odorous contents released from the canister **22** to escape into the atmosphere surrounding the housing **28**. The front **32** also includes an opening **48** and the side **36** includes an opening **50** for providing passages through which audible sounds and light generated within the housing **28** in a manner hereinafter described are emitted from the housing interior.

The device **20** also includes means, indicated **52**, for supporting the canister **22** in an upright condition within the housing interior. The canister **22** includes a cylindrical container **54** having a depressible release valve **24**, mentioned earlier, mounted in the top thereof. The container **54** is similar in construction to spray cans commonly used to dispense paints, insect sprays or hair spray. The contents of the canister **22** which are released upon depression of the valve **24** escape in an

atomized condition through a spray nozzle **56** associated with the valve **24**. In the depicted device **20**, the nozzle **56** opens at generally a right angle to the longitudinal, i.e. vertical, axis of the cylindrical container **54**, and the support means **52** supports the canister **22** adjacent the vent passage **46** of the housing front **32** so that when the valve nozzle **56** is depressed, the canister contents are directed generally through the passage **46** and into the surrounding atmosphere. Once the forces exerted upon the canister **22** for depressing the nozzle **56** to its depressed position are relieved, the nozzle **56** returns to its extended position by means of either the internal pressure of the canister contents or a compression spring associated with the release valve **24**.

The device **20** also includes means, indicated **60**, for intermittently depressing the valve nozzle **56** upon the occurrence of a predetermined event so that the odorant contents of the canister **22** are released from the housing **28** in an intermittent fashion. The depressing means **60** includes an electric servomotor **62**, a cam **64** attached to the shaft of the motor **62** for rotation therewith, an elevated platform **66** hingedly connected to the housing side **34**, and an electric power source in the form of a battery **68**. The platform **66** is elongate and platen-like in form and arranged so as to overlie the top of the valve nozzle **56** intermediate of the platform ends as illustrated in solid lines in FIG. **3**. The hinged connection between one of the platform ends and the housing side **34** permits the platform **66** to be hingedly moved between a raised position as illustrated in solid line in FIG. **3** and a lowered position as illustrated in phantom in FIG. **3**. When the platform end opposite the hinged end is pressed downwardly to the FIG. **3** lowered position, the platform **66** acts as a lever member to move the valve nozzle **56** downwardly to release the canister contents.

For operation of the device **20** in the intended manner, the elevated platform **66** is biased from its lowered position to its raised position so that the nozzle **56** is permitted to return to its extended position once forces exerted upon the canister **22** to depress the nozzle **56** are relieved. In the device **20**, the platform **66** is biased to its FIG. **3** raised position by the upward urging of the platform **66** by the nozzle **56** as the nozzle **56** seeks to return to its extended position. If desired, however, a tension spring **70** may be connected between an end of the platform **66** and the housing top **38** to ensure that the platform **66** returns to its raised position following depression of the valve nozzle **56** in the manner described herein.

The motor **62** is appropriately mounted within the housing **28** so that the cam **64** engages the upper side of the platform **66** as illustrated in FIG. **3**. The cam **64** possesses such a size and shape so that rotation of the cam **64** by the motor shaft effects an upward and downward shifting of the platform **66** between its raised and lowered positions. More specifically, the cam **64** pushes the platform **66** downwardly to its lowered position and permits the platform **66** to return to its raised position in an alternating fashion so that the nozzle **56** is reciprocated by the platform **66** between depressed and extended conditions.

Because the release valve nozzle **56** is intermittently depressed by the depressing means **60** during the rotation of the cam **64**, the contents of the canister **22** are released in an intermittent fashion. Such an intermittent release of contents is preferred over a continual release of contents for the sake of conserving canister contents for reuse of the device **20** at a later time. In addition and as is explained in greater detail herein, the cam **64** is prevented from stopping at a rotational position which holds the valve nozzle **56** in a depressed condition so that the canister contents cannot be completely discharged by de-energizing the motor **62**. Various odorants are known to disperse within the atmosphere within a relatively short period of time, and butyl mercaptan, for example, may be sensed with the nose if only one molecule is present in sixty billion molecules of air. Thus, the intermittent depressing of the nozzle **56** conserves the canister contents at no appreciable expense of the warning capabilities of the device **20**. In addition, the intermittent depressing of the nozzle **56** by the depressing means **60** enables a non-aerosol canister to be used in the device **20**. The release valve of such a canister operates in a manner similar to the spray nozzles commonly associated with window cleaner containers and non-aerosol hair spray containers which require that the release valve nozzle thereof be "pumped" between depressed and extended conditions for releasing contents from the container.

It is another feature of the device **20** that spray canisters having different heights can be mounted within the housing **28** for use with the device **20**. To this end, the support means **52** includes a support platform **72** having a bottom **74** whose distance from the elevated platform **66** can be adjusted. In this connection, the support platform **72** includes a side member **76** having vertically-oriented slots **78**, and there extends through the housing sides **34** and the slots **78** a pair of externally-threaded studs **80**. Wing nuts **82** are threadably positioned about the studs **80** so that by loosening the wing nuts **82**, the support platform **72** may be shifted vertically along the housing side **34** as the slots move along the studs **80**. Conversely, by tightening the wing nuts **82** upon the studs **80**, the platform **72** is secured in position between the housing side **34** and the wing nuts **82**.

To enhance the securement of a canister **22** upon the platform **72**, the device **20** includes a pair of resilient fingers **84** attached to the platform side member **76** and appropriately spaced from one another for tightly encircling the canister container **54** when the container **54** is positioned upon the platform **72**. As the canister **22** is urged into position between the fingers **84**, the fingers **84** flex outwardly to accommodate the movement of the canister **22** therebetween and move into a snap-fit relationship about the lower portion of the canister container **54** once the canister **22** has been positioned in its proper position upon the platform bottom **74**.

To install the canister **22** within the housing **28**, the support platform **72** is lowered to a position accommodating the positioning of the canister upon the platform bottom **74** with no interference from the elevated platform **66**. The canister **22** is then placed upon the platform bottom **74** and between the resilient finger members **84**. The platform bottom **84** is then adjusted in position, i.e., raised along the housing side **34**, until the canister nozzle **56** contacts the underside of the elevated platform **66**. The wing nuts **82** are then tightened to secure the support platform **72** and canister **22** in position beneath the elevated platform **66** so that subsequent raising and lowering of the elevated platform **66** effects a reciprocating of the nozzle **56** between depressed and extended conditions. It follows that the capacity to vertically adjust the position of the platform **72** along the housing side **34** permits the device **20** to utilize

odorant canisters having a height within a broad range of heights.

The device **20** also includes means, generally indicated **90**, for generating an audible alarm and a light **92** for illuminating an area adjacent the device **20** upon the occurrence of a predetermined event. The sound-generating means **90** is in the form of a sound device **94** adapted to emit an audible sound upon the passage of electrical current therethrough, and the light **92** includes a standard incandescent bulb **95** which is also energized upon the passage of electrical current therethrough. The sound device **94** and the light **92** are suitably mounted within the housing **28** so that when the housing front **32** is in a closed position, the sound device **94** and light **92** are positioned adjacent the corresponding opening **50** or **48** provided in the front **32** and side **36**, respectively, so that sound emitted by the sound device **94** exits the housing **28** through the side opening **50** and so that light emitted by the bulb **95** exits the housing **28** through the front opening **48**.

Power for each of the motor **62**, light **92** and sound device **94** is provided by the battery **68**, mentioned earlier, and an input relay **100** is appropriately wired within the circuit of the device **20** for energizing the motor **62**, light **92** and sound device **94** upon the closing of the relay **100**.

The relay **100** of the depicted device **20** is normally-open and permits the device **20** to be interfaced with an auxiliary unit (not shown), such as a smoke or heat detector, so that the device **20** is activated the moment that the auxiliary unit is energized. Accordingly, the auxiliary unit is appropriately wired to the relay **100** through an input plug **102** provided in the housing side **36** so that the relay **100** closes upon the sensing of a predetermined voltage across relay contacts **104** and **106** (FIG. **4**).

To prevent the device **20**, and more particularly, the motor **62** from shutting off while the release valve nozzle **56** is maintained in a depressed position, a limit switch **108** having a plunger-type actuator **110** is mounted within the housing **28** so that its actuator **110** is in contact with the upper side of the elevated platform **66** and moves therewith between raised and lowered positions. The limit switch **108** has contacts **111**, **112** which are open only when the actuator **110** is in a raised condition (corresponding to the raised position of the platform **66**). Therefore, as the elevated platform **66** repeatedly moves between its raised and lowered position by means of the motor **62** and cam **64**, the switch actuator **110** is repeatedly moved between raised and lowered positions to close and open the contacts **111**, **112** of the limit switch **108**. It follows that unless the nozzle **56** is in an extended condition at the moment that the relay **100** opens to deactivate the device **20**, the motor **62** continues to be energized until the elevated platform **66** returns to its raised position.

An advantage provided by the device **20** relates to the emission of both an odorant from the canister **22** and the emission of an audible sound from the sound device **92** upon activation of the device **20**. The odorant, of course, permeates the air so that individuals who are relatively far from the device **20** may smell the odor and react accordingly. Because the odorant is sensed by the nose, the device **20** is particularly well-suited for use by individuals who are blind or partially or totally deaf. In addition, because the sense of smell of a sleeping individual is known to remain alert even though the sense of hearing is normally diminished in power, the odorant emitted from the device **20** may awaken or alert an individual before the sound emitted from the sound device **92** alerts the individual. In any event, the emission of both an odorant and audible sounds from the device **20** provides signals capable of being sensed by an individual's sense of smell and sense of hearing.

The light **92** is advantageous in that it illuminates the area within which the device **20** is mounted when the device **20** is activated. The illumination of such an area may be important if the appropriate reaction of an individual alerted by the device depends upon his being able to see where he is going. Moreover, the light emitted by the light **94** may be particularly important if the device **20** is mounted within a dark area or electrical power routed to other lights in the household is shut off.

With reference to FIG. **4**, the device **20** also includes a test switch **114** mounted in the housing side **36** so as to be accessible from outside the housing **28**. The switch **114** is appropriately wired in the circuit of the device **20** so that electrical power is supplied to each of the motor **62**, light **92** and sound device **94** upon appropriate actuation of the switch **114**. The test switch **114** thus enables an individual to periodically check the operability of the various components of the device **20**.

With reference to FIG. **5**, there is illustrated an alternative embodiment, indicated **120**, of the device of this invention. Several components of the device **120** are identical to those of the device **20** of FIGS. **1–4** and, accordingly, bear the same reference numerals. The device **120** differs from the device **20** in that it includes means, indicated **125**, for intermittently depressing the canister spray nozzle **56** wherein the depressing means **125** includes a solenoid **122** having a plunger **124** which is moved between extended and retracted positions as the solenoid **122** is actuated and de-actuated for, respectively, moving the platform **66** from its raised position to a lowered position and for permitting the platform to return to its raised position. A cycling device **126** is wired in the circuit of device **120** in series with the solenoid **122**.

The solenoid **122** is adapted to move its plunger **124** to an extended condition, and thus move the platform **66** to its lowered position, when a predetermined voltage is sensed across the solenoid contacts **130** and **132** (FIG. **6**). The cycling device **126**, on the other hand, has contacts **134** and **136** which are adapted to open when the platform **66** has been raised to a predetermined position, i.e., to the raised position of the platform **66**. Consequently, the actuation of the solenoid **122** moves the platform **66** to its lowered position at which time the cycling device **126** deactuates the solenoid **122** and permits the platform **66** to return to its raised position. Upon return of the platform **66** to its raised position, the solenoid **122** is re-actuated. Of course, as the platform **66** is repeatedly moved between its raised and lowered positions, the canister spray nozzle **56** is repeatedly moved between depressed and extended conditions.

It will be understood that numerous modifications and substitutions can be had to the aforedescribed device **20** without departing from the spirit of the invention. For example, although each device **20** or **120** has been shown and described as including a power supply in the form of a battery **68** mounted within the housing **28**, a device in accordance with the broader aspects of this invention may be appropriately wired to receive power from a standard electrical outlet. In addition, the device **20** or **120** may include a sound actuator appropriately wired within the circuit of the device for activat-

ing the device upon the sensing of a sound above a predetermined decibel level. Furthermore, automatic phonedialing means may be wired within the circuit of the device **20** or **120** and accessible by way of a phone jack mounted within a side of the housing of the device for automatically dialing a phone number, e.g., the phone number of a police or fire station, upon activation of the device **20** or **120**. Accordingly, the aforedescribed embodiment is intended for the purpose of illustration and not as limitation.

We claim:

1. A scent alarm device comprising:

a spray canister of an odorant having a container containing an odorant under pressure and a depressible release valve having a nozzle which is movable relative to the container between depressed and extended positions for release of canister contents upon the depression of the release valve nozzle to its depressed position and which is biased by the pressurized contents toward its extended position;

means for intermittently depressing the release valve nozzle upon the occurrence of a predetermined event to intermittently release canister contents into the surrounding atmosphere, said means for intermittently depressing including a rotatable cam associated with the release valve for depressing the release valve nozzle in a cyclic fashion as the cam is rotated and a motor which is connected to the cam for rotating the cam as the motor is energized so that upon energizing of the motor, the release valve nozzle is moved relative to the container between its depressed and extended positions; and

means interposed between the release valve nozzle and the motor for preventing the motor from being de-energized as long as the release valve nozzle is in its depressed position so that upon de-energization of the motor, the nozzle is not required to overcome rotational resistance of the motor in order to return to its extended positions.

2. A scent alarm device comprising:

a housing including a wall having a vent passage communicating between the housing interior and housing exterior;

a spray canister of an odorant having a container containing an odorant under pressure and a depressible release valve which is movable relative to the container between depressed and extended conditions for release of canister contents upon the depression of the release valve and which is biased by the pressurized contents toward its extended position;

means for supporting the spray canister within the housing so that upon depression of the release valve to its depressed condition, canister contents are released from the canister toward and through the vent passage; and

means associated with the housing for intermittently depressing the release valve of the spray canister upon the occurrence of a predetermined event to intermittently release canister contents from the housing through the vent passage, said means for intermittently depressing the release valve includes a rotatable cam associated with the release valve for depressing the release valve in a cyclic fashion as the cam is rotated and an electric motor connected to the cam for rotating the cam upon the occurrence of a predetermined event so that as the motor is energized, the release valve is moved relative to the container between its depressed and extended positions; and

means interposed between the release valve and the motor for preventing the motor from being de-energized as long as the release valve is in its depressed position so that upon de-energization of the motor, the nozzle is not required to overcome rotational resistance of the motor in order to return to its extended position.

3. The device as defined in claim **2** wherein the means for intermittently depressing the release valve includes a lever member having a portion which is hingedly connected at a fixed location within the housing and having another portion which is pivotally movable about the fixed location between two pivotal positions and means for repeatedly moving the lever between the two pivotal positions, and the release valve is operatively associated with the lever member so that as the lever member is repeatedly moved between the two pivotal positions, the release valve is depressed in a cyclic fashion.

4. The device as defined in claim **3** wherein the release valve includes a nozzle positioned atop the container for movement relative thereto between depressed and extended conditions, and the supporting means includes a support platform upon which the canister is positioned for supporting the canister container in a stationary relationship with respect to the housing and generally beneath the lever member so that the nozzle is in engagement with the lever member, and the device further includes means for adjusting the distance that the support platform is spaced beneath the lever member so that the canister positioned upon the platform with its nozzle in engagement with the lever member may possess a height within a relatively broad range of heights.

5. The device as defined in claim **4** wherein the support platform is mounted within the housing for movement toward and away from the lever member along a substantially linear path, and the device further includes means for releasably securing the support platform in a preselected position along the linear path.

6. The device as defined in claim **2** further including means operatively connected to the means for intermittently depressing the release valve for interfacing the means for intermittently depressing the release valve with an electrical circuit external to the device so that the means for intermittently depressing the release valve is energized upon the opening or closing of the electrical circuit.

7. The device as defined in claim **2** further including a sound device operatively connected to the means for intermittently depressing the release valve for generating an audible signal when the means for intermittently depressing the release valve is energized.

8. The device as defined in claim **7** further including a light for illuminating an area adjacent the housing when the means for intermittently depressing the release valve is energized.

9. The device as defined in claim **2** further including a light for illuminating an area adjacent the housing when the means for intermittently depressing the release valve is energized.

* * * * *