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BURGLAR ALARM AND LIKE WARNING SYSTEMS

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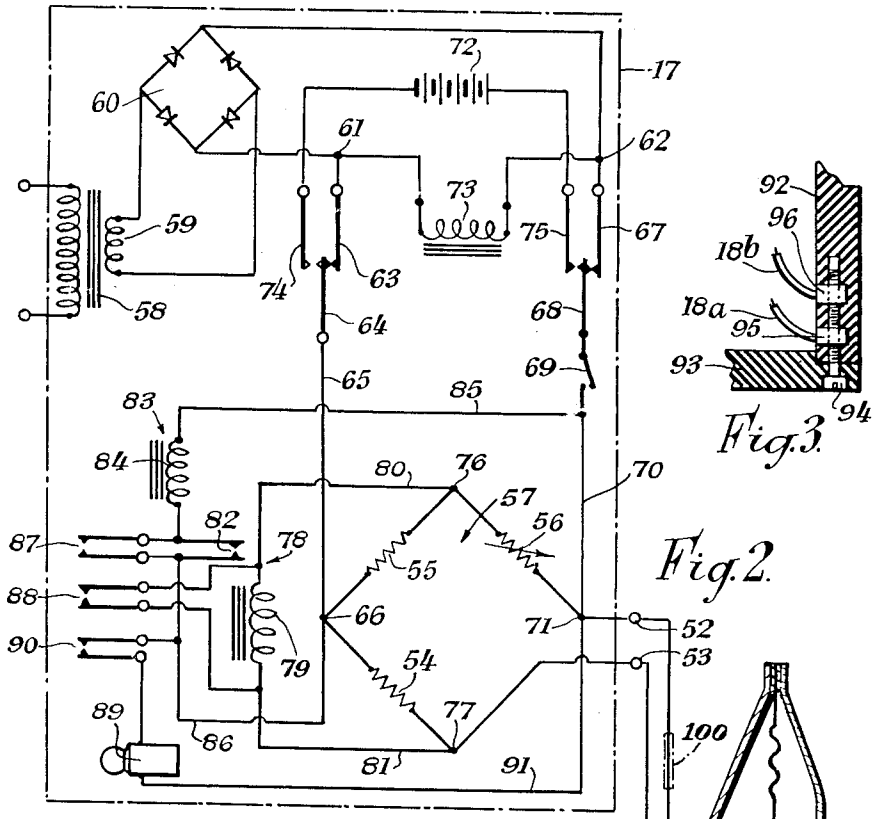


Fig. 2.

Fig. 3.

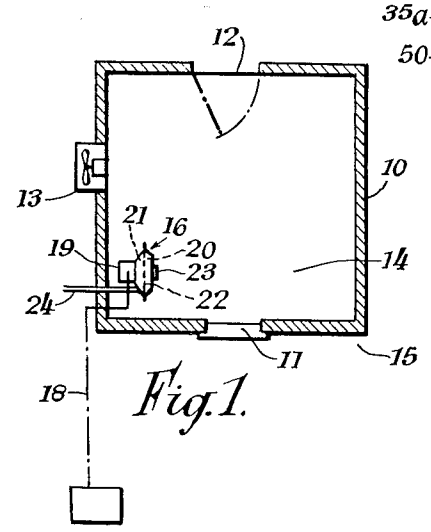
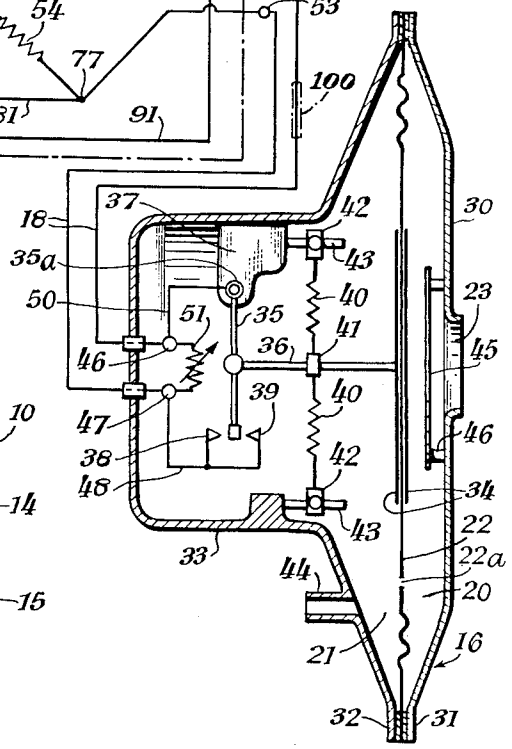


Fig. 1.



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BURGLAR ALARM AND LIKE WARNING SYSTEMS

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8 Claims. (Cl. 340—236)

This invention relates to burglar alarm and like warning systems, hereinafter termed intruder warning systems.

It is the object of the invention to provide an improved system which has been devised so as to be more tamper-proof and more stable than those which have hitherto been used, the improved system being nevertheless relatively simple in construction and being readily adaptable to suit a wide range of safety requirements. The invention is particularly suitable for use in stores, or in drawing offices, studies and other places where work of a confidential or secret nature is carried out, as it enables a high degree of security to be obtained when the premises are normally vacated.

According to the invention, an intruder warning system for protecting the contents of a room having a predetermined leakage rate comprises pressure differential maintaining means for giving to the gaseous atmosphere contained within said room a substantially constant differential pressure of the order of three one-hundredths' of an inch water gauge with respect to the gaseous atmosphere outside said room and for simultaneously forcing a substantially constant volume of gaseous atmosphere determined by said leakage rate to sweep through said room, a pressure sensitive device interposed between and in fluid communication respectively with the interior and the exterior of said room on the corresponding side thereof, said pressure sensitive device being movable from a first neutral position in response to variations in said volume of said gaseous atmosphere sweeping through said room which are insufficient to disturb said pressure differential to a second unstable position determined by any variation in said volume of said gaseous atmosphere sweeping through said room which is sufficient to disturb said pressure differential and created by any abnormal change in said leakage rate, and signal means connected to said pressure sensitive device whereby when said pressure sensitive device moves to said second unstable position said signal means is operated to thereby give warning.

The invention enables a very sensitive yet entirely stable alarm system to be produced, which is simple to install and yet is effective against any manner of entry into a room or other chamber, as the device operates by variations of differential air pressure between the inside and outside of the chamber. Anyone forcing an entry is bound to affect the equilibrium of this differential air pressure, either by making (or increasing) an opening which reduces the differential, or by reducing or blocking an already existing opening, thereby causing the pressure differential to increase. The apparatus required is very compact and, the sensitive part thereof can be disposed at any convenient part of the chamber, or can even be outside if desired. Nevertheless it will be affected by anyone opening a door or window, or cutting an additional hole anywhere in the walls, floor or ceiling, or even coming through an existing hole, such as a chimney or ventilator.

Preferably an electrical Wheatstone bridge circuit is provided in conjunction with the pressure-sensitive device and is normally in a state of balance, actuation of the pressure-sensitive device due to change of atmospheric pressure differential between the inside and outside of the chamber causing the bridge circuit to be unbalanced, and the warning to be given. Thus the electric switch may short-circuit at least a part of one arm of the Wheatstone bridge circuit to reduce the impedance thereof when the atmospheric pressure differential changes from its normal value. If desired a relay system may be operatively connected with the Wheatstone bridge circuit so as to be operated when said bridge circuit assumes an unbalanced state.

It is desirable that the pressure sensitive device include bleed means for permitting a relatively small quantity of gaseous atmosphere to flow continuously through said pressure sensitive device either from the interior or the exterior of said room so that when said pressure sensitive device is in said first neutral position it is simultaneously stable as a result of the existence of said pressure differential but upon any interference either with the opening of said bleed means or with the fluid communication on either the interior or the exterior of said room respectively on the corresponding side of said pressure sensitive device the latter becomes unstable and moves to said corresponding second unstable position independently of whatever variations of said volume of said gaseous atmosphere sweeping through said room and whereby said pressure sensitive device is self-protecting.

It will be understood that the warning itself may take various forms so as to suit the circumstances best, but it is expected that in normal cases the warning will be of such a nature that it will not be perceptible to the unauthorised person who causes the warning to be given. For example, the warning may take the form of alarm signals to a remote position occupied by guards, police or other authorised persons; said signals can be in the nature of supersonic whistles, interruption of a continuously emitted short-wave radio signal, emission of short-wave radio signals, audible signals, visible signals, ultra-violet light signals detactable only by suitable electrical apparatus, infra-red ray signals detectable only by suitable electrical apparatus.

One form of warning system will now be described by way of example in conjunction with the accompanying drawings, in which:

Figure 1 is a diagrammatic plan of the general arrangement;

Figure 2 is an electrical wiring diagram; and

Figure 3 is a fragmentary sectional elevation of a safety fastening device for the lid of the casing.

In Figure 1 a room to be protected against intrusion is indicated generally at **10**, said room having a window **11** and door **12**. The floor and ceiling are imperforate so that when the window **11** and door **12** are closed, the room forms a substantially sealed chamber. For the purpose of the present invention, however, a perfect seal is by no means essential and the usual cracks around the door and other minor openings can usually be disregarded, as the invention will work satisfactorily even when the total leakage area amounts to, say, half a square foot or even more. In the example shown an electrically driven fan unit **13** is fitted into an opening in one of the walls and serves normally to produce a predetermined pressure differential between the atmosphere in the space **14** inside the room and the atmosphere in the surrounding space **15**. It is preferred that the fan unit **13** should act to reduce the pressure inside the room, but the invention can be worked satisfactorily using an increased pressure within the room. The fan unit **13** is, of course, driven

from the mains electricity supply in the normal manner and is maintained in continuous operation for the whole time that the warning system is effective. It has been found that very satisfactory and reliable results can be obtained with a pressure differential of about 9/100 of an inch water gauge positive or negative in the room space. The warning system itself comprises two main units, namely a pressure sensitive unit 16 conveniently disposed inside the room 10 and a relay unit 17 which may be closely associated with the unit 16, but is preferably disposed at a remote point, the two units being connected together by a twin insulated electrical conductor 18. The pressure sensitive unit 16 is in the form of a casing 19 which is divided into two compartments 20 and 21 by a flexible diaphragm 22. The compartment 20 is in free communication with the atmosphere 14 inside the room 10 through an opening which is indicated at 23; on the other hand the compartment 21 is sealed but is connected by a pipe 24 to the atmosphere 15 outside the room. If desired, of course, the arrangement could be reversed, the unit 16 being disposed outside the room and having its sealed compartment 21 connected to the inside atmosphere 14 by a pipe passing through the wall.

Further details of construction of the system and the electrical connections between the components are shown in Figure 2. The casing 19 of the pressure-sensitive unit 16 comprises a front casing portion 30 having a flange 31 around its periphery which is secured to a corresponding flange 32 upon a rear casing portion 33, the margin of a circular flexible diaphragm 22 being clamped in an airtight manner between the two flanges. At its centre the diaphragm is stiffened by a pair of very thin light metal plates 34 and to these a light metal wire link 36 is attached, its free end being pivoted to a pendulous switch arm 35. This is pivoted at 35*a* to an anchorage 37 fixedly mounted with respect to the rear casing portion 33 and its lower end is disposed between a pair of fixed (but possibly adjustable) contacts 38, 39, said contacts being so spaced that the switch arm 35 can occupy a normal intermediate position in which it is free of both contacts. The link 36 is resiliently constrained by a plurality of radially disposed light coiled tension springs 40 which are attached at their inner ends to a collar 41 on the link 36 while their outer ends are attached to anchorage blocks 42 slidably adjustable upon fixed rods 43 extending parallel with the axis of the diaphragm 22. The blocks 42 are secured by set screws and by sliding them along the rods 43 the diaphragm can be resiliently biassed in the axial direction so that pressure differential of predetermined value (positive or negative) is necessary to act upon the diaphragm 22 in order that the switch arm 35 may be brought to and held in its normal intermediate position in which it is touching neither of the contacts 38, 39. Any substantial increase or decrease in the value of the differential pressure then causes contact to be made at 38 or 39, although a general increase or decrease affects both sides of the diaphragm equally and does not affect the switch arm 35. The rear casing portion 33 is provided with a pipe nipple 44 for connection to the pipe 24 leading to the outer atmosphere; the front casing portion 30 is formed with the vent opening 23, this being protected by an internal plate 45 held upon brackets so as to cover the opening 23 and thus prevent the diaphragm 22 being probed, at the same time permitting the front compartment to communicate freely with the atmosphere 14 within the chamber 10.

A small hole 22*a* is formed in the diaphragm 22 to serve as a leak of predetermined size. The flow of air through this, due to the normal pressure differential, is very small and does not affect the operation in the ordinary way. If however an attempt is made to tamper with the system of blocking either the pipe 24 or the opening 23, this will not have the expected result of fixing the diaphragm 22; instead the leak 22*a* will enable the pressures in the two compartments 20, 21 to become equal, thus destroying the pressure differential so that the resulting movement of the diaphragm brings about engagement between the arm 35 and the contact 38 or 39 to give the alarm, as will be hereinafter explained.

A variable resistor 51, conveniently having a value around 500 ohms, is mounted within the casing portion 33 and is connected across a pair of terminals 46, 47. The switch contacts 38, 39 are both connected to the terminal 47 by a wire 48, while a wire 50 connects the terminal 46 to the anchorage 37 and thus to the switch arm 35. Therefore when the switch arm 35 touches either one of the contacts 38, 39 the resistor 51 is short-circuited. The twin conductor 18, forming the sole connection between the pressure sensitive unit 16 and the remainder of the apparatus, is connected to the terminals 46 and 47.

The relay unit 17 has a pair of terminals 52, 53 to which the conductor 18 is attached and these are connected into a Wheatstone bridge circuit which is indicated generally at 57 and comprises two fixed resistors 54 and 55 and a variable resistor 56, the fourth arm of the bridge thus being constituted by the resistor 51 of the pressure sensitive unit. The power supply for the Wheatstone bridge 57 comprises a mains transformer 58 having its secondary winding 59 connected through a bridge rectifier 60 to a pair of feed points 61, 62. The feed point 61 is connected through a fixed relay contact 63, moving contact 64 and lead 65 to one pole 66 of the Wheatstone bridge; similarly the feed point 62 is connected through fixed relay contact 67, moving contact 68, a re-set switch switch 69 and lead 70 to the pole 71 of the Wheatstone bridge 57. The moving contacts 64 and 68 belong to a change-over relay which operates automatically if the mains supply fails and acts to substitute a battery 72. Thus the change-over relay comprises an electromagnetic coil 73 connected directly across the feed points 61, 62 and adapted to shift the movable contacts 64 and 68 to the right when it is energised. The battery 72 is connected to fixed contacts 74 and 75 which are engaged respectively by the moving contacts 64 and 68 in the event of the change-over relay coil 73 becoming de-energized; this of course connects the battery 72 across the poles 66 and 71.

The intermediate poles of the Wheatstone bridge 57 are indicated at 76 and 77, and of course the potential difference existing between these points is dependent upon whether or not the Wheatstone bridge is in a balanced state. The relay unit includes a sensing relay which is indicated generally at 78 and has an electromagnetic coil 79 connected directly across the poles 76, 77 by wires 80 and 81. The coil 79 when energised serves to close a single pair of contacts 82. Thus under normal operating conditions the Wheatstone bridge 57 is in a balanced state as the resistor 51 is effectively connected across the terminals 52, 53, and as a result there is substantially no potential difference across the poles 76, 77 so that the sensing relay 78 is de-energised and the contact 82 remains open. Immediately the diaphragm 22 is deflected in either direction from its normal position, however, the switch arm 35 short-circuits the resistor 51, thus placing the Wheatstone bridge 57 in a state of unbalance and causing the sensing relay 78 to be energised, with the result that the contact 82 is closed, at least momentarily.

In order that any closure of the contact 82, however brief, may bring the warning means into action in a permanent manner, the following arrangement is employed. A hold-on relay indicated at 83 has an electromagnetic coil 84 which is connected across the power supply leads 70 and 65, respectively, by a wire 85 and by a wire 86 leading through the contact 82; thus as soon as the contact is closed the hold-on relay 83 is energised and in order that the energisation may be permanent, the hold-on relay 83 incorporates a pair of contacts 87 which are closed and are connected in parallel with the contact 82 so that subsequent reopening of the latter cannot de-

energise the coil 84. The hold-on relay 83 also includes a pair of contacts 88 which are closed to short-circuit the sensing relay 78 so as to avoid over-loading the coil 79 thereof. The alarm itself, which in this instance is indicated as an electric bell 89, is brought into operation by a pair of contacts 90 on the hold-on relay; one side of these contacts is connected to the supply through the wire 86, while the other side is connected through the bell 89 and wire 91 to the supply lead 70. When the alarm is operated and it is desired to re-set the apparatus, the re-set switch 69 is opened, thus cutting off the power from the hold-on relay 83 so that the contact 87 opens and enables the re-set switch 69 to be again closed, leaving the system in its sensitive or operative condition.

It will be appreciated that any attempt to interfere with the working of the pressure sensitive unit 16 while the device is in operation is practically certain to start the alarm. For example if the wires 18 are cut, this will increase the resistance across the terminals 52, 53 to a value greatly exceeding 500 ohms and will upset the balance of the Wheatstone bridge 57 sufficiently to operate the sensing relay 78. Shortcircuiting wires 18 will, of course, have the same effect as disturbing the diaphragm 22. Any person entering the room 10 through the door 12 or window 11 or by forcing an entry in any other way is bound to affect the delicate pressure differential created by the fan or blower 13 and will thus operate the warning through the corresponding deflection of the diaphragm 22.

The improved system for giving warning of an intruder may very advantageously be adapted to operate additionally as a fire alarm, and for this purpose a resistor, the ohmic value of which varies with temperature, may be connected in series with one of the leads of the conductor 18. Such a resistor is indicated in broken lines at 100 in Figure 2. When the apparatus is set up and adjusted the value of the resistor 51 is chosen so that, together with the resistance (at normal temperature) of the resistor 100, the resistance across the terminals 52, 53 is such that the Wheatstone bridge 57 is in a state of balance. Therefore any substantial change in the value of the resistor 100 due to fire will unbalance the bridge 57, as also will the short-circuiting of the resistor 51 by disturbance of the diaphragm unit 16 as described above.

In some cases it may be desirable to ensure that the pressure responsive unit 16 is not interfered with without operating the warning, and this is particularly so when said unit is disposed outside the room or chamber to be protected and is connected thereto through a pipe. In these circumstances the arrangement shown in Figure 3 can be adopted, the pressure sensitive device (not shown) being disposed within an outer casing or box 92 having a lid 93 secured by a number of screws, one of which is shown at 94. One or more of these screws is arranged to form part of the electrical circuit of the device so that when such a screw is withdrawn it breaks the circuit and initiates the alarm. For instance, in Figure 3 the screw 94 is threaded into two metal blocks 95 and 96 which are embedded in the insulating material of which the box 92 is composed. The blocks 95, 96 are inserted into one side of the twin conductor 18, the two wires being indicated at 18*a* and 18*b*. It will be seen that the stem of the screw 94 thus completes the circuit between the wires 18*a* and 18*b*, whereas withdrawal of the screw inevitably breaks the circuit.

It will be understood that the details mentioned above are given by way of example only and that various other modifications may be made to suit requirements.

I claim:

1. An intruder warning system for protecting a substantially closed chamber, including means for modifying the atmospheric pressure in said chamber relative to that existing exteriorly thereof, a pressure sensitive element by which a warning is given or controlled, said pressure-sensitive element being sensitive to variations of pressure in said chamber caused by varying the extent of atmospheric communication between the inside and outside of said chamber and having a non-warning position corresponding to a predetermined pressure-differential between the inside and outside of the chamber and having at least two warning positions, one on each side of its non-warning position, and being arranged to be moved in opposite directions, from its non-warning position, to one or the other of its oppositely disposed warning positions by any significant decrease or increase of the pressure-differential, one side of said pressure-sensitive element being exposed to the atmosphere on the inside of said chamber and the other side of the pressure-sensitive element being exposed to the atmosphere on the outside of said chamber, a restricted passageway forming a communication between the two sides of said pressure-sensitive element, said restricted passageway being so small in relation to the aforementioned pressure-modifying means that so long as said pressure-modifying means remains operative at substantially the pressure-modifying level for which it was set, the leakage through said restricted opening will not be sufficient to move pressure-sensitive element to one of its warning positions but so that if the aforementioned pressure-modifying means either ceases to operate altogether or operates at a substantially reduced pressure-modifying level from that for which it was set, then the pressure-differential on opposite sides of said pressure-sensitive element will be sufficiently reduced through said restricted opening to cause the pressure-sensitive element to move into one of its warning positions.

2. An intruder warning system for protecting a substantially closed chamber, including means for modifying the atmospheric pressure in said chamber relative to that existing exteriorly thereof, a pressure-sensitive element by which a warning is given or controlled, said element being sensitive to variations of pressure in said chamber caused by varying the extent of atmospheric communication between the inside and outside of said chamber and having a non-warning position corresponding to a predetermined pressure-differential between the inside and outside of the chamber and having at least two warning positions, one on each side of its non-warning position, and being arranged to be moved in opposite directions, from its non-warning position, to one or the other of its oppositely disposed warning positions by any significant decrease or increase of the pressure-differential, bleed means in said pressure sensitive device for permitting a relatively small quantity of gaseous atmosphere to flow continuously through said pressure sensitive device either from the exterior or the interior of said chamber without causing said sensitive device to assume a warning position, an electrical sensing circuit including a circuit-modifying element operable by said pressure-sensitive element, a sensing relay electrically connected with said circuit-modifying element, said sensing relay including a switch closed when said sensing relay is energized, a holding and alarm relay electrically connected through the switch of said sensing relay and energized whenever said circuit-modifying element is operated by the movement of said pressure-sensitive element into either one of its two warning positions, said holding relay including a self-energizing switch closed when said holding relay is energized by said sensing-relay-switch and including also a signaling switch closed when the holding relay is so energized either by the switch of said sensing relay or by the self-energizing switch of said holding relay.

3. An intruder-warning system for protecting a substantially closed chamber, including means for modifying the atmospheric pressure in said chamber relative to that existing exteriorly thereof, a pressure-sensitive element by which a warning is given or controlled, said element being sensitive to variations of pressure in said chamber caused by varying the extent of atmospheric communication between the inside and outside of said chamber and having a non-warning position correspond-

ing to a predetermined pressure-differential between the inside and outside of the chamber and having at least two warning positions, one on each side of its non-warning position, and being arranged to be moved in opposite directions, from its non-warning position, to one or the other of its oppositely disposed warning positions by any significant decrease or increase of the pressure-differential, bleed means in said pressure sensitive device for permitting a relatively small quantity of gaseous atmosphere to flow continuously through said pressure sensitive device either from the exterior or the interior of said chamber without causing said sensitive device to assume a warning position, a balanced electrical sensing circuit including at least three legs and connected with a source of electrical energy, a circuit-modifying element in one of said legs and operable by said pressure-sensitive element to unbalance said sensing circuit whenever the pressure-sensitive element is moved into either one of its two warning positions, a sensing relay electrically connected with said sensing-circuit so as to be energized whenever the said sensing circuit is unbalanced, said sensing-relay including a switch closed when said sensing relay is energized, a holding relay electrically connected through said switch of the sensing relay and energized therethrough whenever said sensing relay is energized, said holding relay including a self-energizing switch closed when said holding relay is energized by said sensing-relay-switch and including also a signaling switch closed when the holding relay is so energized either by the switch of said sensing relay or by the self-energizing switch of said holding relay.

4. An intruder-warning system for protecting a substantially closed chamber, including means for modifying the atmospheric pressure in said chamber relative to that existing exteriorly thereof, a pressure-sensitive element by which a warning is given or controlled, said element being sensitive to variations of pressure in said chamber caused by varying the extent of atmospheric communication between the inside and outside of said chamber and having a non-warning position corresponding to a predetermined pressure-differential between the inside and outside of the chamber and having at least two warning positions, one on each side of its non-warning position, and being arranged to be moved in opposite directions, from its non-warning position, to one or the other of its oppositely disposed warning positions by any significant decrease or increase of the pressure-differential, bleed means in said pressure sensitive device for permitting a relatively small quantity of gaseous atmosphere to flow continuously through said pressure sensitive device either from the exterior or the interior of said chamber without causing said sensitive device to assume a warning position, a balanced electrical sensing circuit including at least three legs and connected with a source of electrical energy, a circuit-modifying element in one of said legs and operable by said pressure-sensitive element to unbalance said sensing circuit whenever the pressure-sensitive element is moved into either one of its two warning positions, a sensing relay electrically connected with said sensing-circuit so as to be energized whenever the said sensing circuit is unbalanced, said sensing-relay including a switch closed when said sensing relay is energized, a holding relay electrically connected through said switch of the sensing relay and energized therethrough whenever said sensing relay is energized, said holding relay including a self-energizing switch closed when said holding relay is energized by said sensing-relay-switch and including also a signaling switch closed when the holding relay is so energized either by the switch of said sensing relay or by the self-energizing switch of said holding relay, said holding relay also including a shorting switch electrically connected across the electrical energizing element of said sensing-relay.

5. An intruder warning system for protecting a substantially closed chamber, including means for modifying the atmospheric pressure in said chamber relative to that existing exteriorly thereof, a pressure-sensitive element by which a warning is given or controlled, said element being sensitive to variations of pressure in said chamber caused by varying the extent of atmospheric communication between the inside and outside of said chamber and having a non-warning position corresponding to a predetermined pressure-differential between the inside and outside of the chamber and having at least two warning positions, one on each side of its non-warning position, and being arranged to be moved in opposite directions, from its non-warning position, to one or the other of its oppositely disposed warning positions by any significant decrease or increase of the pressure-differential, bleed means in said pressure sensitive device for permitting a relatively small quantity of gaseous atmosphere to flow continuously through said pressure sensitive device either from the exterior or the interior of said chamber without causing said sensitive device to assume a warning position, a balanced electrical sensing circuit including at least three legs operatively connected with said power-output terminals of said power-switching relay, a circuit-modifying element in one of said legs and operable by said pressure-sensitive element to unbalance said sensing circuit whenever the pressure-sensitive element is moved into either one of its two warning positions, a sensing relay electrically connected with said sensing-circuit so as to be energized whenever the said sensing circuit is unbalanced, said sensing-relay including a switch closed when said sensing relay is energized, a holding relay electrically connected to said power-output terminals of said power-switching relay through said switch of the sensing relay and energized therethrough whenever said sensing relay is energized, said holding relay including a self-energizing switch closed when said holding relay is energized by said sensing-relay-switch and including also a signaling switch closed when the holding relay is so energized either by the switch of said sensing relay or by the self-energizing switch of said holding relay.

6. An intruder warning system for protecting a substantially closed chamber, comprising means, such as a fan or blower, for modifying the atmospheric pressure in said chamber relative to that existing at the outside thereof, and a pressure-sensitive device by which a warning is given or controlled, said device being sensitive to variations of pressure in said chamber caused by varying the extent of atmospheric communication between the inside and outside of the chamber, said pressure-sensitive device comprising a casing having a diaphragm which divides the interior thereof into two compartments, one of said compartments being in communication with the atmosphere within the chamber, and the other being in communication with the atmosphere outside the chamber, an electrical warning switch operated by said pressure-sensitive device when said device is actuated by pressure variations, said casing formed with a vent opening which is shielded by a baffle member to screen the diaphragm and protect it against interference by probing and bleed means in said pressure sensitive device for permitting a relatively small quantity of gaseous atmosphere to flow continuously through said pressure sensitive device either from the exterior or the interior of said chamber without causing said sensitive device to assume a warning position.

7. An intruder warning system for protecting the contents of a room having a predetermined normal leakage rate, comprising pressure differential maintaining means for giving to the gaseous atmosphere contained within said room a substantially constant differential pressure of the order of three one-hundredths' of an inch water gauge with respect to the gaseous atmosphere outside said room and for simultaneously forcing a substantially constant volume of gaseous atmosphere determined by said leakage rate to sweep through said room, a pressure sensitive device interposed between and in fluid communication respectively with the interior and the exterior of said

room on the corresponding side thereof, said pressure sensitive device being movable from a first neutral position in response to variations in said volume of said gaseous atmosphere sweeping through said room which are insufficient to disturb said pressure differential to a second unstable position determined by any variation in said volume of said gaseous atmosphere sweeping through said room which is sufficient to disturb said pressure differential and created by any abnormal change in said leakage rate, signal means connected to said pressure sensitive device whereby when said pressure sensitive device moves to said second unstable position said signal means is operated to thereby give warning, and bleed means in said pressure sensitive device for permitting a relatively small quantity of said gaseous atmosphere to flow continuously through said pressure sensitive device without causing said sensitive device to move to the second unstable position.

8. An intruder warning system constructed according to claim 7, and wherein the relatively small quantity of gaseous atmosphere flows continuously through the bleed means of said pressure sensitive device either from the interior or the exterior of said room so that when said pressure sensitive device is in said first neutral position it is simultaneously stable as a result of the existence of

said pressure differential but upon any interference either with the opening of said bleed means or with the fluid communication on either the interior or the exterior of said room respectively on the corresponding side of said pressure sensitive device the latter becomes unstable and moves to said corresponding second unstable position independently of whatever variations of said volume of said gaseous atmosphere sweeping through said room and whereby said pressure sensitive device is self-protecting.

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