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Declarations under Rule 4.17:
— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
— *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*
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Published:
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(54) Title: GAS ALARMS

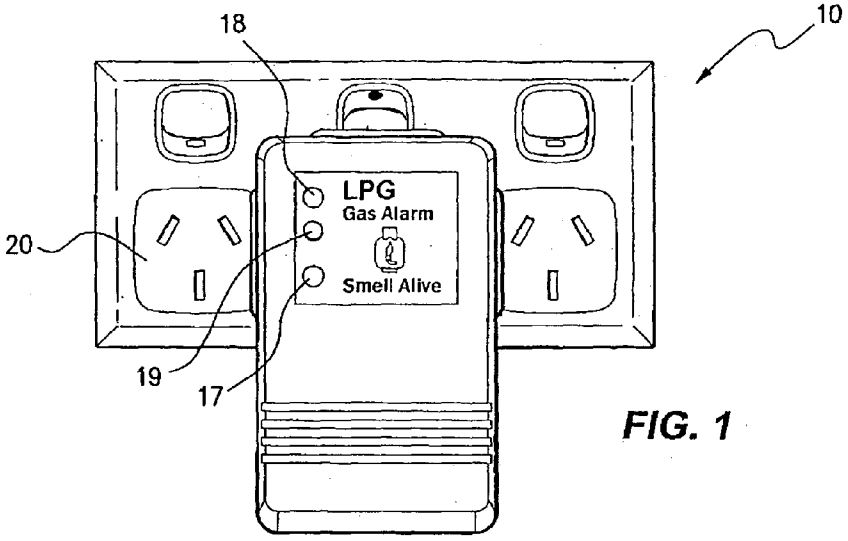


FIG. 1

(57) **Abstract:** A gas alarm comprising a unit adapted to be connected to an electrical power source which includes therein a sensor unit for the type of gas to be detected, power supply means to operate a heater coil in the sensor and the remaining circuitry, means whereby when the output of the sensor indicates the presence of the gas to be detected to cause operation of a warning device. The device can detect different, selected gasses and may be used in enclosed building areas or motor vehicles.

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GAS ALARMS

Technical Area

This invention relates to gas alarms and in particular to alarms which can be located in an area where a gas appliance is or may be used, or gas stored, to provide an alarm should there be any escaping gas detected and which, at the same time, is safe to have in such an area.

Background to the Invention

Whilst in Australia all buildings must have smoke detectors, many buildings use gas for cooking, hot water or heating and, in many cases, these gas appliances have pilot lights and, in most cases, have means whereby there are thermal cut-outs. However, gas stoves, for example, do not normally have such things and cut-outs can fail in devices such as hot water services and heating systems, so there can be a release of gas into the atmosphere which can reach dangerous levels, either to the health of people breathing the air or from a fire safety point-of-view where an explosive, inflammable mixture can develop and there is normally no way of detecting this other than by smell.

In many cases persons' sense of smell are compromised and they would not

recognise the gas smell until the level is dangerous and, if a person is asleep, it is quite possible they would not be awoken.

Outline of the Invention

The object of the invention is to provide such a detector.

The invention includes a gas alarm comprising a unit adapted to be connected to an electrical power source which includes therein a sensor unit for the type of gas to be detected, power supply means to operate a heater coil in the sensor and the remaining circuitry, means whereby when the output of the sensor indicates the presence of the gas to be detected to cause operation of a warning device.

The alarm can be used in different circumstances, such as in enclosed building spaces and motor vehicles and can be adapted to ascertain the presence or various gasses,

Preferably the device includes test means whereby the operation of the device can be checked and it may also include a fan to ensure that air from the surround is fed into the sensor.

Description of an Embodiment of the Invention

In order that the invention may be more readily understood, one embodiment of this shall be described in relation to the accompanying drawings; in which:

Fig 1 Shows an external view of a first embodiment of the alarm connected to a standard power point;

Fig 2 Shows a plan view of the embodiment of Fig 1; and

Fig 3 Shows the operating circuit of the sensor element.

The alarm can be used for sensing the presence of a gas and for domestic and industrial areas this would be natural gas or LPG although in some areas methane could be used as could coal gas. The operation of the alarm can be considered to be similar for each of these but the actual operating parameters of the detector, or even the type of detector itself, could be adapted to changed to suit the particular gas type to be monitored.

The alarm has a casing 10 of a moulded plastics material having associated therewith pins 11 for direct connection to a general purpose outlet 20. If required, there could be provided a flexible conductor connected into the alarm and having a plug on the end thereof for connection to an outlet.

The input power passes through a transformer to provide a required output voltage and there is then preferably a rectification and smoothing circuit to provide a constant voltage, and one particular example, a 9-volt regulated

voltage. If required the power supply may have two output voltages as will be described later herein.

The sensor device 15 may be a commercially-available device and in general terms such devices comprise a sintered-bulk semi-conductor which have a heating coil 16 located therein, the arrangement being such that if air containing a combustible gas is passed through the sensor element, the gas will be burnt by the heating element and the temperature in device will rise, causing a variation in resistance of the semi-conductor and effectively a change in an output voltage V_{RL} across a load R_L.

It was stated earlier that the power supply could provide more than one voltage and as can be seen from Fig 3 the heater 16 may use a voltage V_H and the operating circuit a voltage V_C.

The change in the voltage V_{RL} can be ascertained by a detector circuit and indicates an alarm condition, when the change reaches a pre-determined value. This, in turn, will initiate an operation of an alarm device which may be both audible and visible. In one particular form the alarm device can be a Piezo horn which has an operating frequency of 3.7 Khz but this of course is a preferment as such a horn can readily fit within a small casing and gives a substantial warning signal.

The casing can have thereon indicator lights 17,18, one of which 17 is a power indication light so there is a visible indication that the device is operating and the other 18 being an alarm device which can be, say, a flashing red light or whatever is desired which operates when an alarm condition is detected by the sensor.

In another embodiment of the invention there is, in the casing, a fan (not shown) which enables ambient air to be drawn through the sensor thereby providing a more sensitive indication of the presence of gas.

The alarm also has a testing circuit which has a manual operation button 19 which indicates the alarm is operating correctly.

The device of this embodiment is designed for use in enclosed spaces having a source of power, specifically domestic and commercial premises.

The invention also includes self-powered alarms which could be used in substantially enclosed barbeque areas and the like and alternatively powered alarms which could be used, for example, in gas powered vehicles and which are operated from the vehicle's power supply.

It is to be understood that many other variations and modifications can be made in the alarm of the invention without departing from the spirit and scope thereof.

I claim:

1. A gas alarm comprising a unit adapted to be connected to an electrical power source which includes therein a sensor unit for the type of gas to be detected, power supply means to operate a heater coil in the sensor and the remaining circuitry, means whereby when the output of the sensor indicates the presence of the gas to be detected to cause operation of a warning device.

2. An alarm as claimed in claim 1 wherein the sensor includes a heating element so that any gas in the air adjacent the sensor is ignited and changes the temperature of the sensor which, in turn changes the resistance of the sensore which change can be identified and cause an alarm signal to be generated.

3. An alarm as claimed in claim 2 wherein the change in resistance of the sensor is ascertained by the change in voltage across a load.

4. A gas alarm as claimed in any preceding claim wherein the unit is to detect the presence of gas in a domestic or industrial environment wherein the electrical power source used is mains power.

5. A gas alarm as claimed in any one of claims 1 to 3 wherein the unit is to

detect the presence of gas in a motor vehicle wherein the electrical power source used is power obtained from the vehicle's electric supply..

6. A gas alarm as claimed any preceding claim wherein the alarm includes a fan to ensure that air from the surround is fed into the sensor.

7. A gas alarm as claimed in any preceding claim wherein the alarm includes test means whereby its operation can be checked

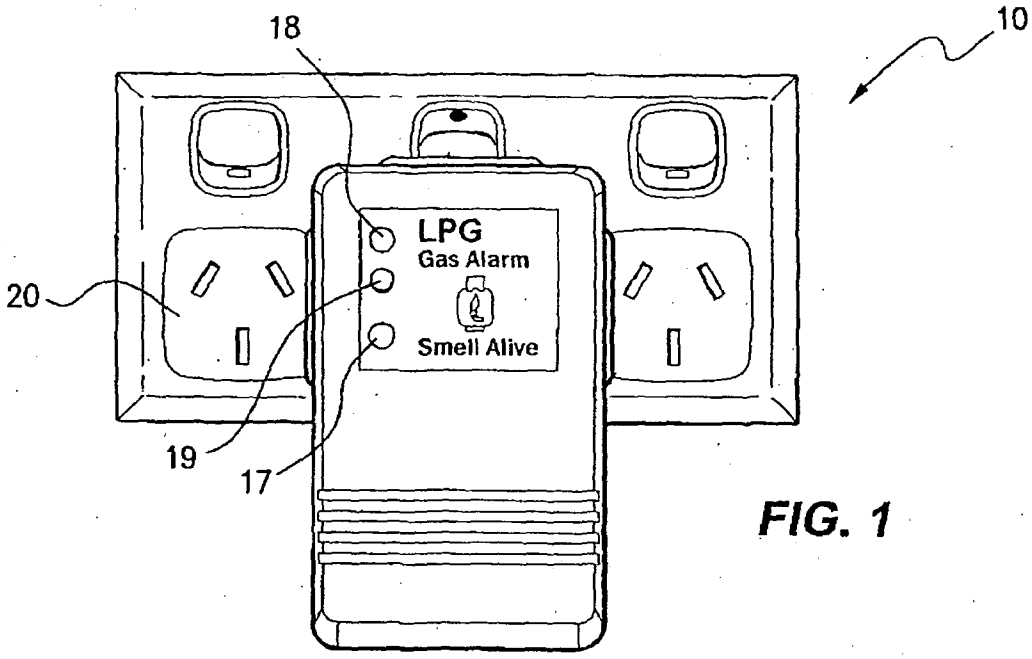


FIG. 1

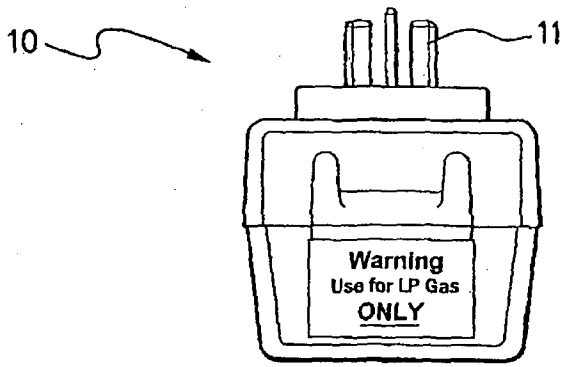


FIG. 2

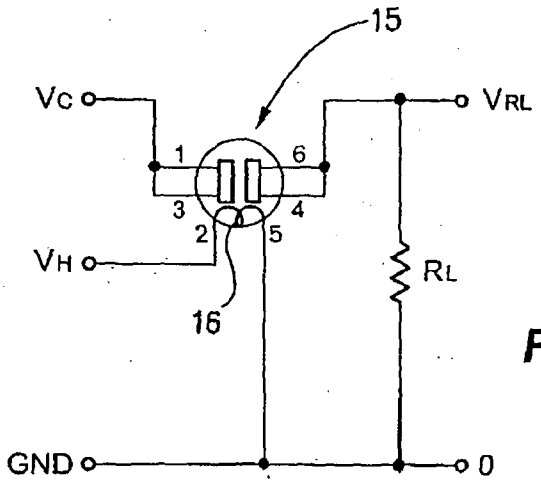


FIG. 3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2008/000516

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl.

G08B 21/16 (2006.01) ***G08B 17/117*** (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPOQUE Full-text (gas w alarm+, gas s (detect+ or sens+), power s supply, heat+ s (element or coil or resist+),ignite+ or burn+ or combust+ or flam+)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	US 4007456 (PAIGE et al) 8 February 1977 Column 3, Lines 30-33; Column 3, Lines 36-41 Column 3, Lines 6-12	1-3, 7, 4-6
Y	US 4335379 (MARTIN) 15 July 1982 Column 3, Lines 6-12	4
Y	US 3786462 (HAYDEN) 15 January 1974 Column 1, Lines 32-33	5
Y	US 4295028 (TANABE) 13 October 1981 Column 1, Lines 63-65	6

☐ Further documents are listed in the continuation of Box C ☒ See patent family annex

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
20 June 2008	27 JUN 2008
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustralia.gov.au Facsimile No. +61 2 6283 7999	Authorized officer **DEVANAND NAGARAJAN** AUSTRALIAN PATENT OFFICE (ISO 9001 Quality Certified Service) Telephone No : (02) 6283 2698

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/AU2008/000516

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member					
US	4007456	NONE					
US	4335379	NONE					
US	3786462	NONE					
US	4295028	CA	1138940	DE	3006714	FR	2449850
		GB	2045987	JP	55112935		

Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.

END OF ANNEX