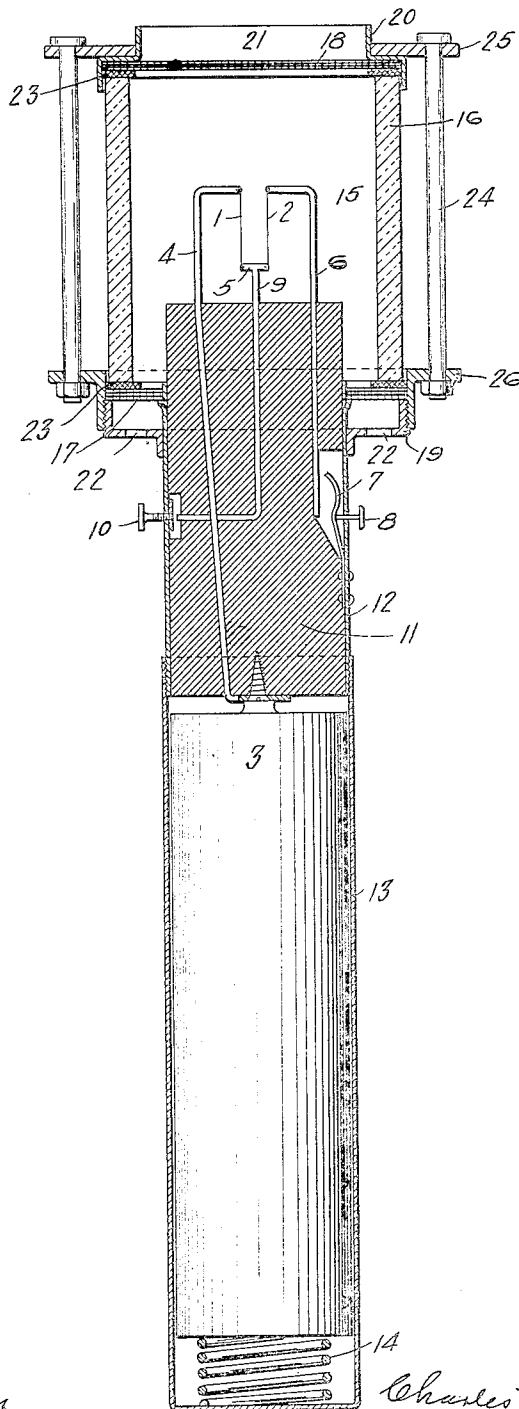


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WITNESSES

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METHANE-DETECTOR.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, CHARLES M. MEANS, a resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Methane-Detectors, of which the following is a specification.

This invention relates to a device for indicating or detecting the presence of explosive, inflammable, or otherwise dangerous gases, such as in mines, tunnels, sewers, buildings or other places where dangerous conditions may exist because of the presence of gases.

The object of the invention is to provide a device for the purpose named which utilizes an electric current for the detection of such gases. A further object of the invention is to provide a device for the purpose stated whereby within reasonable limits of accuracy the percentage of gas present can be determined. A further object of the invention is to provide a device of the character specified comprising a glower which is catalytically affected by the gas when heated, with the provision of means for restoring its catalytic properties in case of deterioration.

The invention comprises the combination and arrangement of parts hereinafter described and claimed.

The accompanying drawing shows a sectional view through the preferred form of the device.

As illustrated, the detector comprises a primary glower 1, having catalytic properties and capable of becoming luminous in the presence of gas, such as a metal compound, for instance, of platinum, and which is arranged to be heated, preferably by an electric current; and in the particular embodiment illustrated said primary glower is used in conjunction with a secondary glower 2, which does not possess catalytic properties in the presence of gas, but is capable of becoming luminous when heated, such as by an electric current. These two glowers are in circuit with a suitable source of electricity, such as dry battery 3, and are preferably in series with each other. As shown, one pole of the battery is connected through the conductor 4 with one end of the primary glower, while the other end of said primary glower is connected to the conductor 5, to which

conductor is also connected one end of the secondary glower 2, whose opposite end is connected through conductor 6 to the opposite pole of the battery 3. In one of the conductors 4 or 6, as for instance in the conductor 6, is a switch 7 for opening and closing said circuit. This switch is shown as a spring switch normally holding the circuit open and is arranged to close the circuit by means of a push button 8. The conductor 5 is connected through conductor 9 to the last named pole of the battery 3, and in this connection there is also a circuit opening and closing device, shown as a screw 10, which normally is open, and when closed serves to short circuit glower 2 for a purpose hereinafter described.

These elements may be made in a great variety of forms and may be variously arranged. They may be used in connection with the ordinary electric mine lamp, or with a separate battery, as shown, either primary or secondary. As illustrated, the conductors 4, 6 and 9 are embedded in an insulating body 11, which in turn is inclosed in a casing 12, while the battery 3 is held in a casing 13 having a screw-threaded connection with the casing 12, and having in its bottom a spring 14 for holding the battery 3 in firm contact with the terminal of conductor 4. The casings 12 and 13 are metallic and form the return path to the negative pole of the battery, and the switch 7 and short circuiting screw 10 have a conducting connection with casing 12.

The glowing element or elements are preferably contained in a protecting chamber having gauze walls to permit the free circulation of air or gas therethrough but which will prevent an explosion or an ignition of the gases on the outside of the device in case of an explosion or ignition within the protecting gauzes, and which chamber is provided with a suitable window through which the glowing element or elements are visible. As illustrated, said glowers are inclosed in a chamber 15 formed by a transparent tube 16, such as a glass tube, and having its ends closed by protecting gauzes 17 and 18. These gauzes each consist of three-ply wire gauze, and are clamped against the ends of the glass tube 16 by rings 19 and 20 respectively. The top ring 20 is provided with a large central opening 21

while the bottom ring is provided with a plurality of smaller openings 22, as a result of which the air or gas can freely circulate through chambers 15. To prevent the entrance of gas anywhere except through the openings 22, the ring 19 has a close fit around the casing 12, while the insulating body 11 has a close fit in the interior of said casing and completely fills the same, and packing rings 23, such as asbestos, are interposed between the ends of the tube 16 and the rings 19 and 20. The several parts forming the walls of chamber 15 are held together by means of clamping bolts 24 passing through a top ring 25 resting on the ring 20 and a bottom ring 26 having a threaded connection with ring 19.

The material comprising the glowers 1 and 2 (or at least the glower 1) has a positive resistance coefficient, the resistance increasing as the temperature increases. The glower 1 has catalytic properties, that is, in the presence of gas its temperature and luminosity increase, while the glower 2 has no catalytic properties, and consequently in the presence of gas the luminosity of glower 2 is decreased due to the increased resistance of the circuit caused by the increased temperature of glower 1. The electric current serves to raise the temperature of the glowers to the point of luminosity, while the gas has the effect of increasing the temperature and luminosity of the primary glower, which results in increasing its resistance, thus cutting down the amount of current flowing and decreasing the luminosity of the secondary glower.

The glowers are energized only at such times as tests for gas are actually being made. This is accomplished by closing the switch 7 to complete the circuit, which allows the current to flow through the two glowers in series. If there is no gas present both glowers will glow with the same intensity, but when brought in the presence of marsh or other gas the glower 1, due to its catalytic properties, will increase in temperature and luminosity, thereby increasing the resistance in the circuit and cutting down the amount of current flowing therethrough and proportionately decreasing the luminosity of glower 2. Consequently the presence of gas is indicated by a difference in temperature or luminosity of the two glowers, and the relative luminosities or temperatures of the two glowers indicate within reasonable limits of accuracy the percentage of gas present. In effect, the glower 2 serves as an indicating device to indicate the change of current flow in the circuit.

By closing the circuit of the conductor 9 by means of the screw 10 the secondary glower 2 is short circuited, and the current then passes only through the primary

glower, thus producing a higher temperature of this glower and restoring its catalytic properties in case these have been lost or have deteriorated by use or because of the presence of a high percentage of moisture or other elements in the air which would cause said glower to deteriorate and lose its catalytic properties. By increasing the temperature of the glower to a proper point, these catalytic properties can be restored and this can be easily accomplished by merely short circuiting the secondary glower by means of screw 10.

The device is very easy and safe to use, and positively indicates the presence of gases, and, with reasonable accuracy, the percentage of gas in the air. The device is very simple and is always in working order, and as no current flows through the glower except when actually testing for gas, the current consumption is very small.

What I claim is:—

1. In a gas detector, a source of electric current, and two glowers located in proximity to each other and in circuit with said source, one of said glowers having catalytic properties and the other not having such properties, whereby the presence and amount of gas is detected by a comparison of the relative luminosities of said glowers.

2. In a gas detector, a source of electric current, two glowers in circuit therewith, one of said glowers having catalytic properties and the other not having such properties, and a casing inclosing both glowers and arranged to admit gas to said glowers.

3. In a gas detector, a source of electric current, two glowers in series in circuit therewith, one of said glowers having a positive resistance coefficient and the property that its temperature is increased in the presence of gas, thereby reducing the current flow through the second glower, said second glower having the property that its temperature is unaffected by the presence of gas, and a casing inclosing said glowers and arranged to admit gas thereto.

4. In a gas detector, a source of electric current, two glowers in series in circuit therewith, one of said glowers having catalytic properties and the other not having such properties, and means in said circuit for causing increased current to flow through the glower having catalytic properties to restore said properties in case of deterioration.

5. In a gas detector, a source of electric current, two glowers in circuit therewith, one of said glowers being arranged to have its luminosity increased in the presence of gas and the other glower being arranged to be unaffected by the gas, and means for short circuiting the last named glower.

6. In a gas detector, a source of electric current, a glower in circuit therewith and

having catalytic properties, a second resistance body in series with said glower, and means for short circuiting said second body and thereby cause an increased current
5 from said source to flow through said glower to restore its catalytic properties in case of deterioration.

In testimony whereof, I have hereunto set my hand.

CHARLES M. MEANS.

Witnesses:

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