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 APPARATUS FOR DETECTING AND INDICATING GASES IN THE ATMOSPHERE.
 APPLICATION FILED MAY 19, 1906.

943,015.

Patented Dec. 14, 1909.

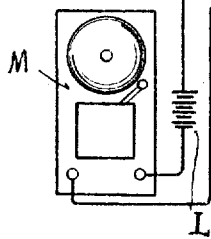
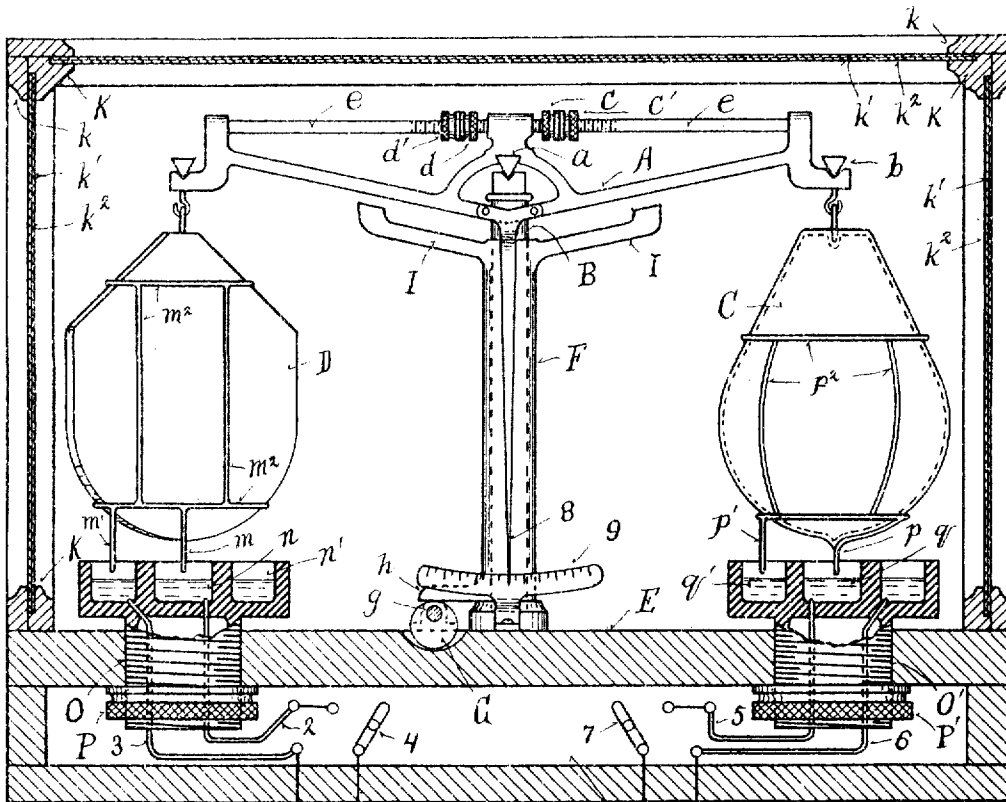


Fig. 1.

Fig. 4.

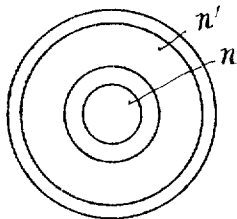
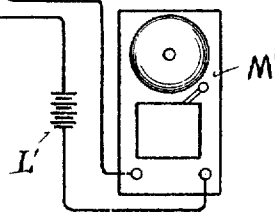
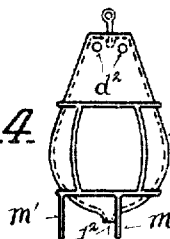


Fig. 2.

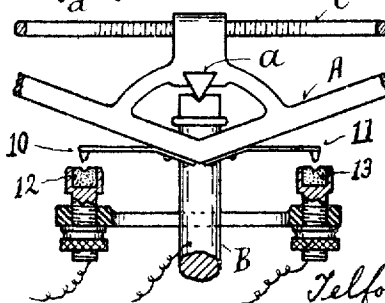


Fig. 3.

Witnesses
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APPARATUS FOR DETECTING AND INDICATING GASES IN THE ATMOSPHERE.

943,015.

Specification of Letters Patent. Patented Dec. 14, 1909.

Application filed May 19, 1906. Serial No. 317,816.

To all whom it may concern:

Be it known that I, TELFORD GROESBECK, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Apparatus for Detecting and Indicating Gases in the Atmosphere, of which the following is a specification.

My invention relates to improved apparatus for indicating the presence of objectionable gases in the atmosphere of mines, cellars, buildings, and other similar places.

One of its objects is to provide reliable and sensitive apparatus for detecting and indicating the presence of illuminating, explosive or life destroying gases in places where such gases are liable to escape or accumulate in time to prevent injury therefrom.

Another object is to provide means for protecting said apparatus from dust or other foreign matter liable to affect its operation.

It further consists in certain details of form, combination and arrangement, all of which will be more fully set forth in the description of the accompanying drawings, in which:

Figure 1 is a side elevation of my improved apparatus with the casing in section. Fig. 2 is a top plan view of one form of contact by means of which an alarm may be sounded. Fig. 3 is a detail view of another form of contact by means of which the alarm may be sounded. Fig. 4 is a modification of the body, D, in side elevation.

In the accompanying drawings, A, represents a balanced scale beam suspended by means of a knife edge, *a*, on the upper end of an upright or column, B. From one end of the beam, A, is suspended a body, C, which preferably consists of a hollow shell of glass from the interior of which the atmosphere has been exhausted and the shell sealed to maintain a vacuum therein. This shell may have, however, air or other gases sealed therein. A knife edge, *b*, serves to support the shell, C, upon the end of the beam. At the opposite end of the beam, A, is supported a body, D, which preferably consists of a plate of glass of practically the same weight as the shell, C, and exposing to the atmosphere approximately the same exterior surface as the shell, C, so that the deposit of moisture, if any, upon the two bodies will

be approximately equal in weight. A hollow shell, D', of glass similar in shape, size and weight to body, C, except that it is provided with one or more openings, *d*², for the access of air or gases to and from the interior thereof, may be employed in place of body, D. Nuts, *d*, *d'*, *e*, *e'*, serve as adjustable weights threaded on the rods, *e*, of the scale beam, and by means of which an accurate adjustment and balance of the scale beam may be attained.

F represents a tube or sleeve mounted on the column, B, and adapted to be adjusted vertically thereon by means of eccentric G mounted on the pivoted rod, *g*, said eccentric engaging a foot *h*, on the tube, F, to elevate the same when the rod, *g*, is turned.

I represents arms projecting from the upper end of tube, F, which when the tube is elevated serve to lift the scale beam from its position on the top of column, B, thereby preventing unnecessary wear on the parts when the apparatus is not in use.

E, represents the base on which the operative parts and protective casing are mounted, and, *e'*, a compartment preferably provided in which are located the switches and binding screws necessary to electrically connect the apparatus with the alarm mechanism.

K represents a permanent casing or framework and *k*, detachable frames which are provided with panels, *k'*, of cotton or other textile material adapted to permit a free circulation of air or gases within or through the casing, and at the same time adapted to intercept dust and other foreign materials or objects liable to affect the action of the apparatus. These textile panels are also preferably reinforced by means of metal screens, *k*².

L, L', represent electrical batteries, or other source of electricity by means of which the alarms may be actuated or sounded.

M, M', represent alarm mechanisms, and which are preferably bells of different pitch, or are otherwise distinguishable one from the other by their action when sounded. These alarms may be located close to the indicating apparatus, or at a distance as desired, and are adapted to be employed either singly or conjointly, as desired.

As shown in Fig. 1 electrical contact to sound alarm, M, is made by means of a pair of contact points, *m*, *m'*, which are carried by body, D, being attached thereto by means

of a wire mesh m^2 . The respective points, m , m' , dip when body, D, descends into separate cups, n , n' , which cups preferably contain mercury or other fluid conductor.

5 The cups, m , m' , are of insulating material and are carried upon a stem, O, which is threaded into the base, E, to enable the cups to be adjusted to the proper height, where they may be locked by means of nuts, P, P'. The body, C, carries two contacts, p , p' , attached to body, C, by wire mesh, p^2 , which contacts as body, C, descends contact with the liquid contents of cups, q , q' . Cups, q , q' , are carried upon a stem, O', threaded in the base and provided with a nut, P', to lock the cups, to the adjusted position. The cups, n , q , are annular in form and encircle the cups, n , q . Wires, 2, 3, connect the cups, n , n' , with the battery, L, and alarm, M, said circuit being controlled by a switch, 4. Wires, 5, 6, lead from cups, q , q' , to the circuit of battery, L', and alarm, M', which circuit is controlled by switch, 7. A pointer 8, carried by the beam A indicates on a scale, 9, when the beam is in equilibrium and also the direction and amount of deflection therefrom.

In the modification Fig. 3 contacts 10, 11, are carried by the scale beams, A, and the deflection thereof causes one or other of said contacts to touch a carbon button, 12 or 13, thereby establishing contact through one or other of the alarms M, M'. Said buttons 12 and 13 are adjustable as to height in the same manner as the mercury cups. The adjustment of the stationary contacts in height, as shown in either Figs. 1 or 3, enables the instrument to be set so as to sound the alarm or to indicate the presence of greater or less quantities of foreign gas in the atmosphere.

The operation is as follows: The case containing the scale beam is located upon a firm support in the mine or other place and the alarms located in the neighborhood thereof, or at a distance therefrom, as desired. The weights, d , d' , c , c' , are adjusted to bring the beam to equilibrium, and the cups, n , n' , p , p' , adjusted to the desired height, and either one or both the switches, 4, 7, closed. The atmosphere of the mine circulates freely through the panels of the casing, and the presence there at any time of a gas lighter than the normal atmosphere will affect the relative weight of the bodies, C, D, causing body, C, to descend and close the circuit by means of the contacts, p , p' dipping in the mercury of cups, q , q' , thereby sounding alarm, M'. Should a gas heavier than the normal atmosphere be present, it will disturb the equilibrium and cause the body, D, to descend, thereby sounding the alarm, M. The external surface of the bodies, C, D, being substantially the same, and their coefficient of absorption

of moisture being the same, they will not be affected by the deposit of moisture thereon.

The mechanism herein shown and described is capable of considerable modification without departing from the principle of my invention.

Having described my invention, what I claim is:

1. In an article of the character indicated, a body forming a sealed chamber suspended in equilibrium and adapted to be influenced by the specific gravity of its surrounding atmosphere, an alarm, an electric circuit adapted to actuate said alarm, a vertically adjustable standard carrying two cups, one located centrally beneath said body, and one encircling said first named cup, fluid conductors of electricity carried by said cups and forming the terminals of said circuit, and a contact carried by said body having one arm adapted to contact with the fluid in said central cup and another arm to contact with the fluid of said encircling cup to close said circuit and sound the alarm.

2. In a device of the type set forth, a balanced beam, a body forming an air-tight sealed chamber suspended from one end of said beam, a second body at the opposite end of said beam, a pair of spaced depending contacts carried by each body, and an adjustable cup for each body, each cup containing two chambers each chamber having a fluid conductor of electricity therein, said cups being rotatable and having their chambers so arranged that they will underlie said contact points of the bodies in any position to which the cup may be turned.

3. In a device of the type set forth, a balanced beam, a body forming an air-tight sealed chamber suspended from one end of said beam, a second body at the opposite end of said beam, a pair of contacts carried by each of said bodies, a cup for each body, each cup containing two concentric chambers arranged one within the other with a fluid conductor of electricity in each chamber, a signal and a battery for each cup, and wires in circuit with said signal and battery, one of said wires extending in one chamber and the other in the other chamber of said cup.

4. In a device of the type set forth, a balanced beam, a body forming an air-tight sealed chamber suspended from one end of said beam, a hollow shell on the other end of said beam having an opening therein whereby its interior communicates with the atmosphere, and alarms adapted for sounding by said body and shell.

5. In a device of the type set forth, a balanced beam, glass bodies on the beam ends, wire mesh secured to said bodies, spaced contact points depending from said wire mesh, an alarm for each body, and means to sound the alarm through said contacts.

6. In a device of the type set forth, a balanced beam, counterbalancing bodies at opposite ends of said beam, one of said bodies forming a sealed chamber, and the
5 other not forming a sealed chamber, said bodies having the same area exposed to the deposit of moisture or dust, an electrical circuit having contacts adapted to be opened and closed by the movements of said bodies,
10 and an electrical alarm adapted to be sounded when said circuit is closed.

7. In a device of the type set forth, a balanced beam, an upright for supporting said beam from its upper end, a vertically
15 movable element, arms at the upper end of said upright to engage said beam, a foot projecting outwardly from said element, and rotatable means to engage said foot and raise said element.

20 8. In a mechanism of the character indicated, a body forming a sealed chamber,

said body being suspended in equilibrium in the atmosphere to be tested, and adapted to be affected by changes in the specific gravity
of said atmosphere, a member supporting 25 said sealed chamber, an alarm, an electric circuit adapted to actuate said alarm, an electrical contact actuated by the movements of said chambered body to close said circuit,
30 and a housing incasing said chambered body and its supporting mechanism, said housing having a plurality of porous walls permitting a circulation of the atmosphere to and from said chambered body, but protecting
35 it against the admission of air drafts and dust or other foreign bodies.

In testimony whereof I have affixed my signature in presence of two witnesses.

TELFORD GROESBECK.

Witnesses:

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