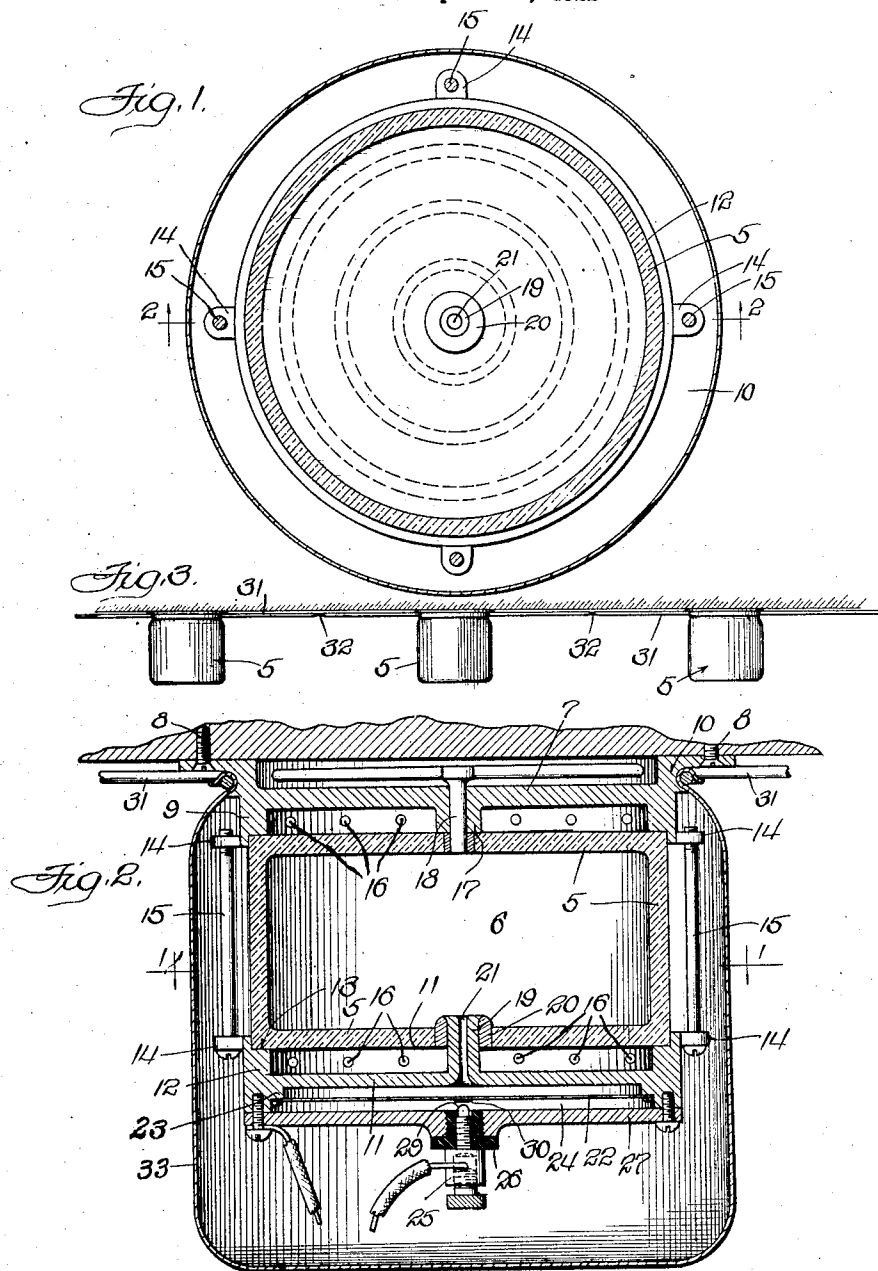


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W. G. SANDERSON
FIRE AND GAS ALARM DEVICE

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UNITED STATES PATENT OFFICE.

WILLIAM G. SANDERSON, OF CHICAGO, ILLINOIS.

FIRE AND GAS ALARM DEVICE.

Application filed April 29, 1922. Serial No. 557,478.

To all whom it may concern:

Be it known that I, WILLIAM G. SANDERSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Fire and Gas Alarm Devices, of which the following is a specification.

This invention relates to fire and gas alarm devices.

One of the objects of the invention is to provide a device that is responsive to fire, or sudden rise of temperature, and is also responsive to an atmosphere that has become vitiated by contamination with deleterious gases, vapors and the like, and which will initiate a suitable alarm indicative of fire or gas pollution.

Another object is to provide a system of fire and gas protection in which a series of my alarm devices may be connected in independent electric circuits and to independent tubes, or they may be included in systems common to all.

Another object is to provide means for protecting the septum of the device to prevent its pores from clogging by dust or dirt.

Another object is to provide a porous septum having a maximum of operative surface.

Another object is to provide a device having a chamber within which the electrical contacts are substantially sealed and protected against atmospheric and other influences.

Another object is to provide a device which will instigate an alarm in situations where the air becomes abnormal as by impregnation with gas or when the temperature is suddenly raised, or when both conditions occur.

Other objects and advantages will hereinafter appear from a consideration of the following description when taken in conjunction with the drawings, wherein:—

Fig. 1 is a transverse section taken on line 1—1 of Fig. 2.

Fig. 2 is a section taken on line 2—2 of Fig. 1.

Fig. 3 shows a series of devices of Figs. 1 and 2 connected to a single tube.

In all the views the same reference characters are employed to indicate similar parts.

The operation of the device is based upon

two physical laws. Its gas detecting quality depends for its operation on the increase of pressure, in a receptacle having a porous wall, due to osmosis, wherein a gas, lighter than air, will pass thru the septum surrounding a chamber more rapidly than the air can find egress, the abnormal pressure thus produced being used to move means for controlling an electric circuit.

The same device when arranged for detecting the presence of a sudden rise of temperature is connected to a small continuous tube having both ends connected to the indicator, or otherwise closed tube, which may be extended from the circuit controlling device to a remote location covering the fire hazard by which air within the tube may be conveyed to the chamber of the controlling device when heated and expanded, whereby to raise the pressure in the chamber surrounded by a suitable porous wall, affecting the same circuit controlling means, as before.

The principles of osmotic actions of gases are so well known as to require no detailed explanation here. That noxious gases will pass thru a porous wall of a receptacle and create a pressure therein is all that is required to be known in the present instance. That air in a tube connected to such a receptacle will create a pressure therein when it is forced thereto, as by its sudden expansion by heat, faster than it can escape thru the porous walls of the septum accounts for the seeming phenomenon when the device functions as a fire responsive circuit controller.

In the structure illustrated 5 is a receptacle or casing having a porous wall enclosing a chamber 6. The casing may well be made of unglazed porcelain having relatively thin walls. It is well to cover as small surface as practicable for supporting the casing and to this end I provide a metal holder plate 7 arranged to be secured to a ceiling or other support by screws 8 and having a peripheral flange 9 to hold the porous casing, and a base peripheral flange 10 to form a foot to receive the attaching screws. Another plate 11 has a flange 12 to provide a shoulder 13 to receive the peripheral edge of the casing 5. Ears 14 project from the plate structures 7 and 11 to receive bolts or screws 15 to hold the parts together.

The flanges 9 and 12 are perforated, as at 16, to admit air or gas to the end surfaces of the porous casing 5.

5 The plate 7 has a central hub 17 thru which passes a tube 18 to the chamber 6 and the plate 11 has a central hub 19 sealed into the end wall of the casing, as at 20, and perforated at 21.

10 A very thin sensitive metallic diaphragm 22 rests on an annular shoulder 23 and is secured thereto. The diaphragm forms a sensitive yielding wall of the chamber 24.

A binding post 25 is secured in an insulating bushing 26 which, in turn, is screwed into the cover plate 27, and which has a contact point 29 for the cooperating contact 30 secured to the center of the diaphragm. If abnormal pressure exists in the chamber 6, these two contacts will be brought into electrical connection by the outwardly bulging diaphragm.

20 If the tube 31 be extended into an adjacent area in the form of a closed ring, and the tube be suddenly heated, as by the occurrence of a fire, the air in the tube will be so expanded as to cause an excessive pressure in the chamber 6 by air entering therein from the tube faster than it can escape thru the pores of the casing, which will cause the diaphragm 22 to bulge outwardly and close the electric circuit.

25 If it be desirable to protect a plurality of given areas against polluted gas filled air as well as against fire, then the devices may be connected as shown in Fig. 3, in which case it is well to close the tube or collapse it as at 32 to prevent the system of one area from interfering with the system of the adjacent area.

30 To maintain the outer surface of the septum or casing clean and prevent the pores thereof filling up with dirt, dust and the like, it may be covered with or enclosed in a flannel bag 33 which may, preferably, be red flannel. This material is very porous and the fine hairs or wool strands catch and hold the fine particles that may be held in mechanical suspension in the air, and it can conveniently be cleaned and replaced.

35 It will be manifest that slow rise of temperature in the tube will permit excess of air in the casing 5 caused by the expansion

due to heat to escape as rapidly as it would otherwise accumulate and, therefore, equilibrium is maintained during changes of temperature under normal conditions. Sudden changes of temperature will, however, force air into the casing faster than it can escape thru the pores of the septum and cause the desired rise of air pressure in the chamber thereof.

The device is well adapted for use in coal mines, and other situations subjected to conditions described prejudicial to health and life of occupants.

The sensitiveness of the device may be modified by coating the inner or outer surface of the porous wall with suitable material such as paint, or the like.

While I have herein shown a single embodiment of my invention for the purpose of clear disclosure, it will be manifest to persons skilled in the art, that many changes may be made in the general arrangement and configuration of the parts, within the scope of the appended claims.

Having described my invention what I claim as new and desire to secure by Letters Patent, is:

1. A circuit controlling device, such as described, comprising a substantially closed chamber having a porous wall, a flexible wall and contacts closed by movement of the flexible wall, and a removable flannel bag substantially surrounding the controlling device.

2. A device of the character described comprising a plate having a cylindrical flange and a radial flange; an annular casing of porous material supported on said cylindrical flange spaced away from said plate; another plate having a cylindrical flange for engagement with said casing; screws supporting said casing between the plate structures, said last mentioned structure providing a diaphragm casing enclosing a chamber communicating with the chamber in said porous casing; a diaphragm in the plate chamber dividing it into two chambers and contacts in the latter chamber controlled by movement of said diaphragm.

In testimony whereof I hereunto subscribed my name.

WILLIAM G. SANDERSON.