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W. NELLISSEN

1,519,549

GAS INDICATING DEVICE

Filed Dec. 29, 1923

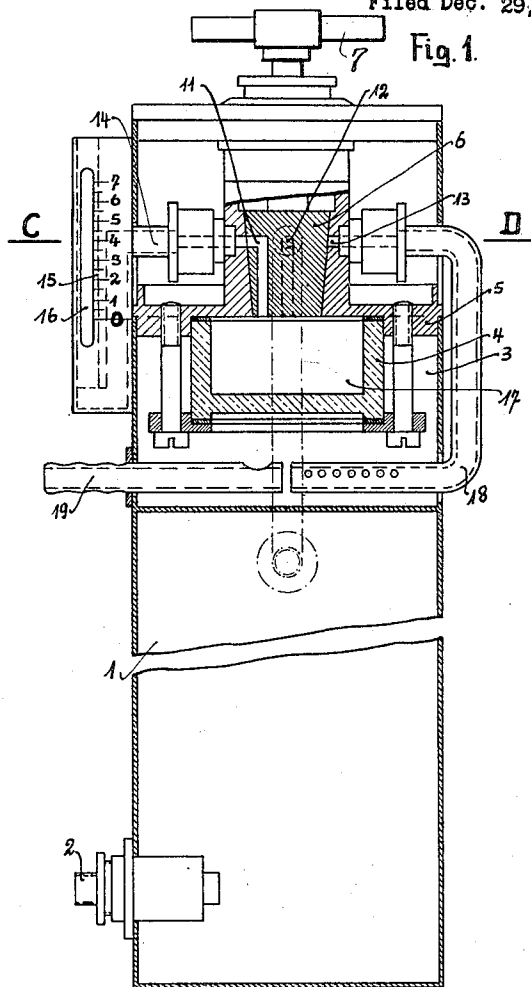


Fig. 1.

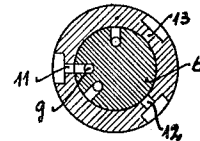


Fig. 3.

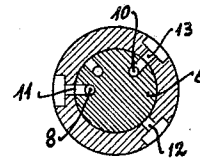


Fig. 4.

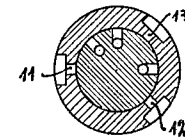


Fig. 5.

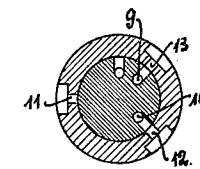


Fig. 6.

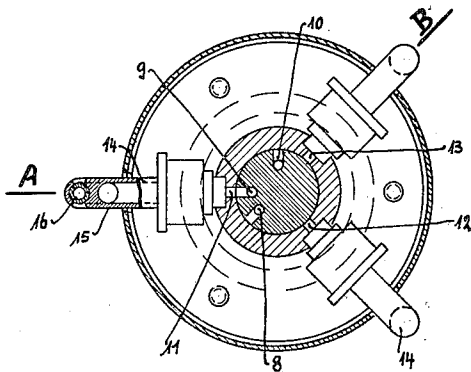


Fig. 2. By

inventor
Willy Nellissen
Wright Bros
attys

UNITED STATES PATENT OFFICE.

WILLY NELLISSEN, OF BIELEFELD, GERMANY.

GAS-INDICATING DEVICE.

Application filed December 29, 1923. Serial No. 683,528.

To all whom it may concern:

Be it known that I, WILLY NELLISSEN, engineer, a citizen of the German Republic, and residing at Bielefeld, Germany, have invented certain new and useful Improvements in Gas-Indicating Devices, of which the following is a specification.

This invention relates to gas indicating devices. Devices of this kind are used to indicate the occurrence of explosive gases such as fire-damp in mines. Arrangements have already been proposed for measuring the admixture of gases with air by means of a diffusion cell. Diffusion cells are particularly suitable for mines because temperatures which exceed that of the surrounding space do not occur in the cells and because, for this reason, they are absolutely proof against fire damp. In spite of this the use of the diffusion cells in mines for indicating fire damp is practically unknown. This is to be accounted for by the fact that after each measurement a diffusion cell has to be moved to a place where there is fresh air for the purpose of removing the gases from the cell which have penetrated into it. The object of the present invention is to provide a measuring arrangement provided with a diffusion cell that enables repeated measurements to be carried out at the place where the measuring arrangement is used. Repeated measuring without removal of the device from its place of use is rendered possible by the present invention because a chamber containing rinsing air is provided which contains sufficient fresh air for several rinsing operations. To restore the diffusion cell after use to a condition which renders it suitable for carrying out a new measurement it is only necessary to conduct into the cell a portion of the fresh air stored in the rinsing air chamber.

The invention is shown by way of example in the drawing in which—

Fig. 1 is a vertical section of an apparatus taken on the line A—B of Fig. 2.

Fig. 2 shows a horizontal section taken on the line C—D of Fig. 1 and

Figs. 3-6 are horizontal sections on the line C—D of Fig. 1 of a controlling valve.

Referring to the drawing 1 is an air tight container which is adapted to be filled with compressed air through a valve 2. Arranged above the container 1 is a chamber 3 which contains the diffusion cell 4. The top wall 5 of the chamber 3 has an upwardly extending cylindrical neck. Ground into this neck is a valve or cock 6 which can be adjusted by means of a handle 7. The diffusion cell 4 is open at the top so that the passages or channels 8, 9 and 10 of the valve 6 are in permanent communication with the interior of the cell. The channels 8, 9 and 10 extend in a vertical direction to a certain level where they turn at right angles so as to have a short horizontal continuation at the top. At the level of the horizontal sections of the channels 8, 9 and 10 holes or passages 11, 12 and 13 are provided in the neck of the top wall 5 of the chamber 3. The passage 11 is connected through a pipe 14 with a limb 15 of a U-shaped liquid pressure meter 16. The passage 12 is connected through a pipe 17 with the rinsing air container 1 and the passage 13 is connected through a pipe 18 with the chamber 3 that contains the diffusion cell. Leading into the chamber 3 is also a pipe 19 to which a hose, that may lead to a gas injector of the ball type, may be connected. The pipe 18 fits loosely in the hole in the chamber through which it is inserted so that no differences of pressure between the air in the chamber 3 and the external air can arise.

The operation of the device is as follows: When a measurement is to be carried out the valve 6 is turned into the position indicated in Fig. 3. In this position the interior of the diffusion cell is connected through the valve channel 9, passage 11 and the pipe 14 with the pressure meter 15, 16. If air from the surrounding space is now injected through the pipe 19 by means of a ball injector (not shown) into the chamber 3 the gas admixtures in the air which are specifically lighter than the air will, on account of their more rapid diffusion, give rise to an increase of pressure in the interior of the diffusion cell 4 and thus cause the liquid column in the pressure meter 16 to rise. If, on the

other hand the admixtures of gas in the air are heavier than the latter, the air in the cell will diffuse faster than the heavy gases, so that a decrease of pressure will be indicated by the pressure meter. After the measuring operation the diffusion cell will be partly filled with the gas admixtures in the air. To remove these and to render the cell suitable for a new measurement the valve 6 is turned into the position indicated in Fig. 6. In this position of the valve the interior of the diffusion cell is connected through the channel 10, passage 12 and the pipe 17 with the rinsing air chamber 1.

Through the channel 9, passage 13 and the pipe 18 the interior of the diffusion cell is connected with the chamber 3 in which the cell is located. Hence a current of rinsing air flows from the rinsing air chamber 1 into the interior of the diffusion cell and thence into the chamber 3 surrounding the cell. From the chamber 3 it escapes through the opening between the loosely fitting pipe 18 and the edges of the hole through which the pipe 18 enters the chamber 3. After sufficient rinsing air has blown through the diffusion chamber the valve 6 is turned into the position indicated in Fig. 4. The pressure meter 16 will then be connected through the pipes 15 and 14, passage 11 and the channel 8 with the interior of the diffusion cell and this latter will be connected through the channel 10, passage 13 and the pipe 18 with the chamber 3, i. e. it will also be connected with the exterior air. An equalization of the pressures in the pressure meter and the interior of the diffusion cell and of the exterior air can thus take place. The device will now be ready for the next measuring operation and, when the next measuring operation is to be commenced, the valve may be again turned into the position shown in Fig. 3. In Fig. 5 a position of the valve is shown into which it is preferably turned when the device is to be carried about or removed. In this position of the valve the one limb 15 of the U-shaped liquid pressure meter is closed against the exterior air, so that the contents of the pressure meter cannot run out, even if the device is laid down.

The field of application of the novel arrangement is not limited to the measuring of fire damp in mines but it may also be used for measuring choke damp. The arrangement may also be put to other uses such as testing the content of hydrogen in the air in accumulator rooms. In factories in which injurious gases are developed the collection of the latter may be prevented with the aid of the aforedescribed apparatus.

I claim:—

1. In a device for indicating gases, a diffusion cell, a pressure meter, a conduit con-

necting the diffusion cell and the pressure meter, a rinsing air chamber, and a closable conduit leading from the rinsing air chamber to the diffusion cell.

2. In a device for indicating gases, a diffusion cell, a pressure meter, a conduit connecting the diffusion cell and the pressure meter, a rinsing air chamber, a closable conduit leading from the rinsing air chamber to the diffusion cell, a chamber enclosing the diffusion cell, and a closable conduit between the diffusion cell and the chamber enclosing the same.

3. In a device for indicating gases, a diffusion cell, a pressure meter, a conduit leading from the diffusion cell to the pressure meter, a rinsing air chamber, a closable conduit leading from the rinsing air chamber to the diffusion cell, a chamber enclosing said cell, a closable conduit leading from the diffusion cell to the chamber enclosing the latter, a multi-way valve for connecting the conduits between the diffusion cell and the rinsing air chamber and between the diffusion cell and the chamber enclosing the latter, the said valve being adapted when turned into a certain position, to simultaneously open the said conduits.

4. In a device for indicating gases, a diffusion cell, a pressure meter, a conduit leading from the diffusion cell to the pressure meter, a rinsing air chamber, a closable conduit leading from the rinsing air chamber to the diffusion cell, a chamber enclosing the diffusion cell, a closable conduit between the diffusion cell and the chamber enclosing the latter, a multi-way valve connecting the conduit between the diffusion cell and the rinsing air chamber and the conduit between the pressure meter and the chamber enclosing the diffusion cell, the said valve being adapted, when in a certain position, to simultaneously open the conduits between the diffusion cell and the rinsing air chamber and between the diffusion cell and the chamber enclosing the latter, and when in a second position to open the conduit between the diffusion cell and the pressure meter and the chamber enclosing the said cell.

5. In a device for indicating gases, a diffusion cell, a pressure meter, a conduit between the diffusion cell and the pressure meter, a rinsing air chamber, a closable conduit between the rinsing air chamber and the diffusion cell, a chamber enclosing the diffusion cell, a closable conduit between the diffusion cell and the chamber enclosing the latter, a multi-way valve interposed in the conduit between the diffusion cell and the rinsing air chamber and in the conduit between the pressure meter and the chamber enclosing the diffusion cell, the said valve being adapted, when in one of its po-

sitions, to simultaneously open the conduit between the diffusion cell and the rinsing air chamber and between the diffusion cell and the chamber enclosing the same and, in
5 a second position, to simultaneously open the conduit between the diffusion cell and the pressure meter and the chamber surrounding the cell, and in a third position, to close the conduit between the pressure meter and the diffusion cell. 10

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

WILLY NELLISSEN.

Witnesses:

E. KASPACEH,

M. V. HUNCH.