(No Model.)

A. GUÉGUEN.

MEANS FOR DETECTING THE ESCAPE OF GAS FROM GAS MAINS.

No. 478,424. Patented July 5, 1892.

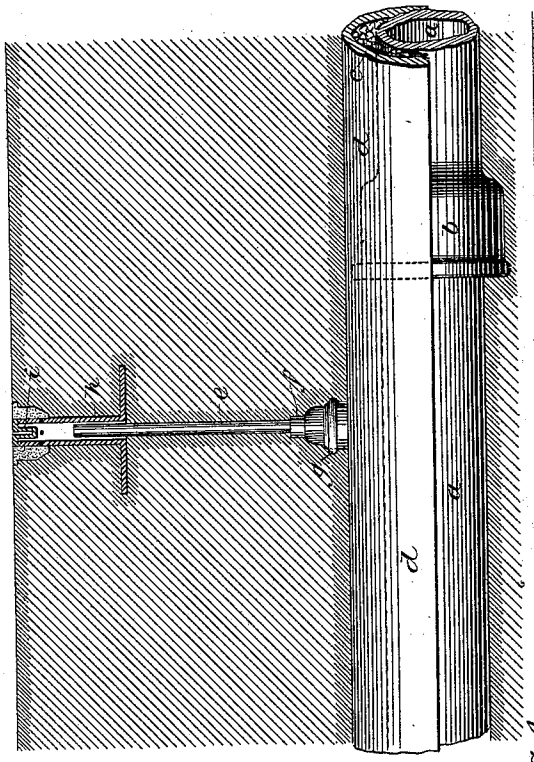


Fig. 1.

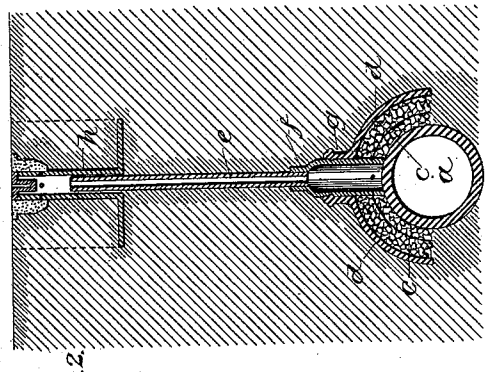


Fig. 2.

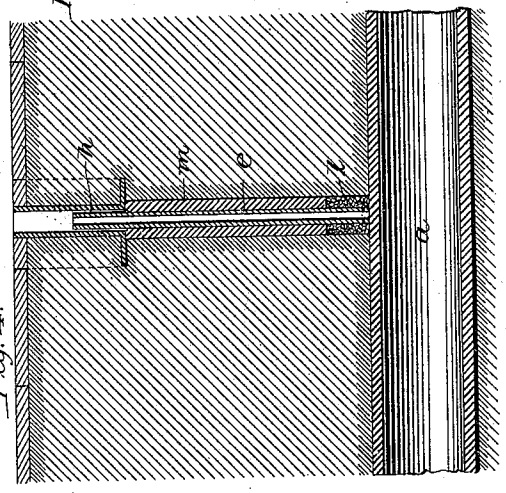
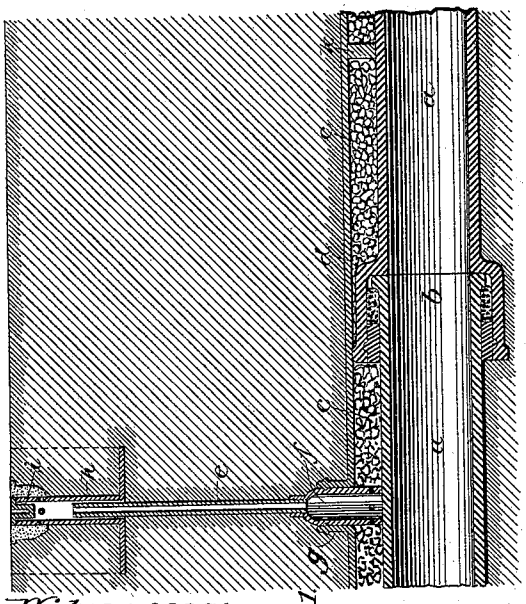


Fig. 4.



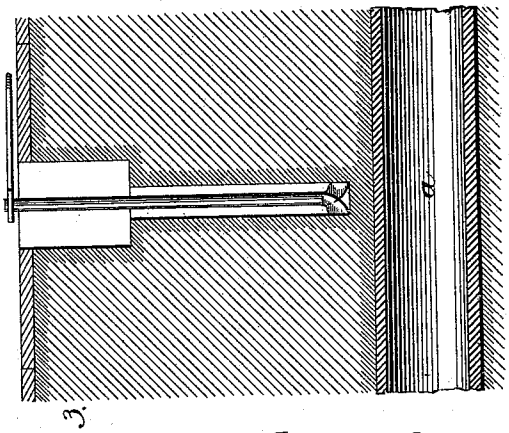


Fig. 3.

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UNITED STATES PATENT OFFICE.

ALPHONSE GUÉGUEN, OF PARIS, FRANCE, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE CHARTIERS VALLEY GAS COMPANY, OF PITTSBURG, PENNSYLVANIA.

MEANS FOR DETECTING THE ESCAPE OF GAS FROM GAS-MAINS.

SPECIFICATION forming part of Letters Patent No. 478,424, dated July 5, 1892.

Application filed April 29, 1886. Serial No. 200,597. (No model.)

To all whom it may concern:

Be it known that I, ALPHONSE GUÉGUEN, a citizen of the Republic of France, residing at Paris, have invented certain new and useful Improvements in Means for Detecting the Escape of Gas from Gas-Mains; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

My invention relates to methods for the discovery of leakage in gas pipes or conduits.

It consists, generally stated, in placing over a portion of the gas-conduit a layer or body of stones or similar loose solid material, which rests on the conduit and is so covered and surrounded by the earth as to form a separate and isolated chamber or gallery and placing the same in communication with the atmosphere by a vent-pipe through which the gas can escape to the atmosphere, and by which, therefore, a leakage may be detected and located in a particular part of the conduit.

It also consists in extending said layers of bodies of stones continuously over portions of the conduit and isolating them from each other, so forming a series of isolated sections or galleries and providing each such section with a vent-pipe by which leakage from any particular section may be detected and located.

It also consists in combining with the gas-conduit and the chamber or gallery formed by the layer or body of stones or loose material a tarred cloth or similar cover surrounded and covered by the earth, which will prevent the entrance of dirt into the chamber or gallery and connecting such chamber with the atmosphere by means of the vent tube or tubes.

It also consists in certain other improvements, as hereinafter particularly set forth.

To enable others skilled in the art to make and use my invention, I will describe the same more fully, referring to the accompanying drawings, in which—

Figure 1 is a longitudinal section, partly in full lines, illustrating my invention as applied to a new conduit; and Fig. 2 is a cross-section of the same. Figs. 3 and 4 illustrate the application of my invention to a conduit already laid.

The section of tubing forming the conduit may be connected by joints of any desired construction, the conduit *a* shown being connected by the ordinary bowl-and-spigot joint *b*, packed with lead or other suitable material.

When my invention is applied to new conduits, I employ a thin layer or packing *c* of stones over the upper part of the conduit, these stones being generally interposed between the conduit, and a cover *d* of tarred cloth or paper or other suitable material, and the layer of stones forming a kind of chamber or gallery in which the gas leaking or escaping from the conduit will collect. In forming this gallery I prefer to first saturate a sheet of felt with tar or other heavy oils of bituminous coal and sand the same interiorly with stones of about the size of lentile, so that the felt does not adhere to the side of the pipes. In this manner a continuous gallery of two or three millimeters in height is formed over and at the sides of the conduit, within which the gas escaping from the leaks necessarily collects, since in order to arrive there they are not obliged to overcome the resistance which the soil opposes to them elsewhere. The gas-collecting galleries are placed in communication with the atmosphere by vent-tubes *e*, generally placed directly over the conduits. These vent-tubes consist of an iron tube the lower part of which is screwed into a cylinder or chamber *f*, of somewhat larger size, perforated with four small rectangular openings communicating with the gallery by means of a bell-mouth *g*, formed by the bituminized cloth. The other end of the tube *e* enters rather freely with friction into a cast-iron socket *h*, following the movements of the ground and closed by a removable plug *i*. The discharge of the gas into the atmosphere takes place by small horizontal channels made upon the exterior surface of the socket below the top plate of the plug. In this way

the settling of the earth into the escape-orifices is avoided. The gallery may be made in isolated sections, being separated by a packing, as at *k*, or in other suitable manner, and each vent-tube communicates with one of these sections, as shown. When the conduits have been already laid, the gas-collecting gallery does not exist or least finds itself very imperfectly constituted by the small shrinkage which generally exists between the pipes and the material filled in the trench. It is then necessary to increase the number of vent-tubes employed and create the gallery each time the occasion presents itself, and in such cases my invention may be applied in the following manner: The flagstone or other pavement over a surface of about a square decimeter is removed, and a hole is dug about fifty centimeters in depth, the hole being as near as possible directly over the axis of the conduit. By means of a conical iron screw terminating below in two well-tempered points and at the other extremity in a flat iron rod and an iron lever fitting on the same a hole is bored within this large hole down to the conduit, which is then laid bare by a scoop or other suitable tool. With this method of boring there is no danger of piercing or cracking the conduit. Into the hole so made the vent-tube *e* is then lowered, while disposing as well as possible around its openings large gravel, forming a species of chamber, as at *l*. The annular space *m* around the pipe is filled with earth or clay well stamped, and the tests are taken as hereinafter described.

Where my improvements are employed with gas conduits or mains in case of leakage the gas escaping from the leaks will collect in the collecting galleries or chambers formed of the stones and tarred paper covering or stones around the openings of the vent-pipes, since in order to arrive there they are not obliged to overcome the resistance which the soil opposes to them elsewhere, and the gas will pass upwardly through the vent-pipes, so that warning will be given thereof by the odor given out, and as each vent-tube or passage communicates with an isolated section of the gallery the probable position of the leak is thus indicated, even beneath the most impermeable chaussée. As the circulation of the air and gases is always extremely slight in these galleries or chambers, and as the smaller leaks could be but poorly distinguished by the sense of smell from the vapors and odoriferous elements emanating from the surrounding earth, in order to render the indications more efficacious and to recognize the smallest traces of loss which may take place within the conduits, an air-pump is applied to the vent-tube by means of an india-rubber bushing or otherwise, thereby permitting the exhaustion of the air from the gallery or chamber. The gaseous mixture is immediately submitted to an analysis to test whether it contains leakage-gas.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, with an underground gas-conduit, of a layer or body of stones or similar loose solid material resting on said conduit and extending over a portion thereof and so covered and surrounded by earth as to form a separated and isolated chamber or gallery, and a vent-pipe leading from said chamber to the surface of the ground, through which the gas can escape to the atmosphere, and by which a leakage may be detected and located in any particular part of the conduit, substantially as described.

2. The combination, with an underground gas-conduit, of layers or bodies of stones or similar loose solid material resting on said conduit and extending continuously over portions thereof and covered and surrounded by the earth, such bodies being so separated as to form a series of isolated sections or galleries, and a vent detector-pipe leading from each such section to the surface of the ground and by which leakage from any particular section may be detected and located, substantially as set forth.

3. The combination, with an underground gas-conduit, of a layer or body of stones or similar loose material extending over any desired portion of the conduit, a tarred cloth or similar cover extending over the stones and covered and surrounded by earth, and a vent or detector pipe leading from the chamber so formed to the surface of the ground, substantially as set forth.

4. The combination, with an underground gas-conduit, of a cover of tarred cloth or similar material extending over and on each side of the gas-conduit, and a vent-pipe communicating with the space between the cover and the conduit, substantially as set forth.

5. The combination, with an underground gas-conduit, of a vent-pipe communicating with an enlarged chamber resting on the conduit, and a cover of tarred cloth or similar material extending over said chamber and down the sides of said conduit, substantially as and for the purposes set forth.

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

ALPHONSE GUÉGUEN.

Witnesses:

ROBT. M. HOOPER,

G. DE MESTRAL.