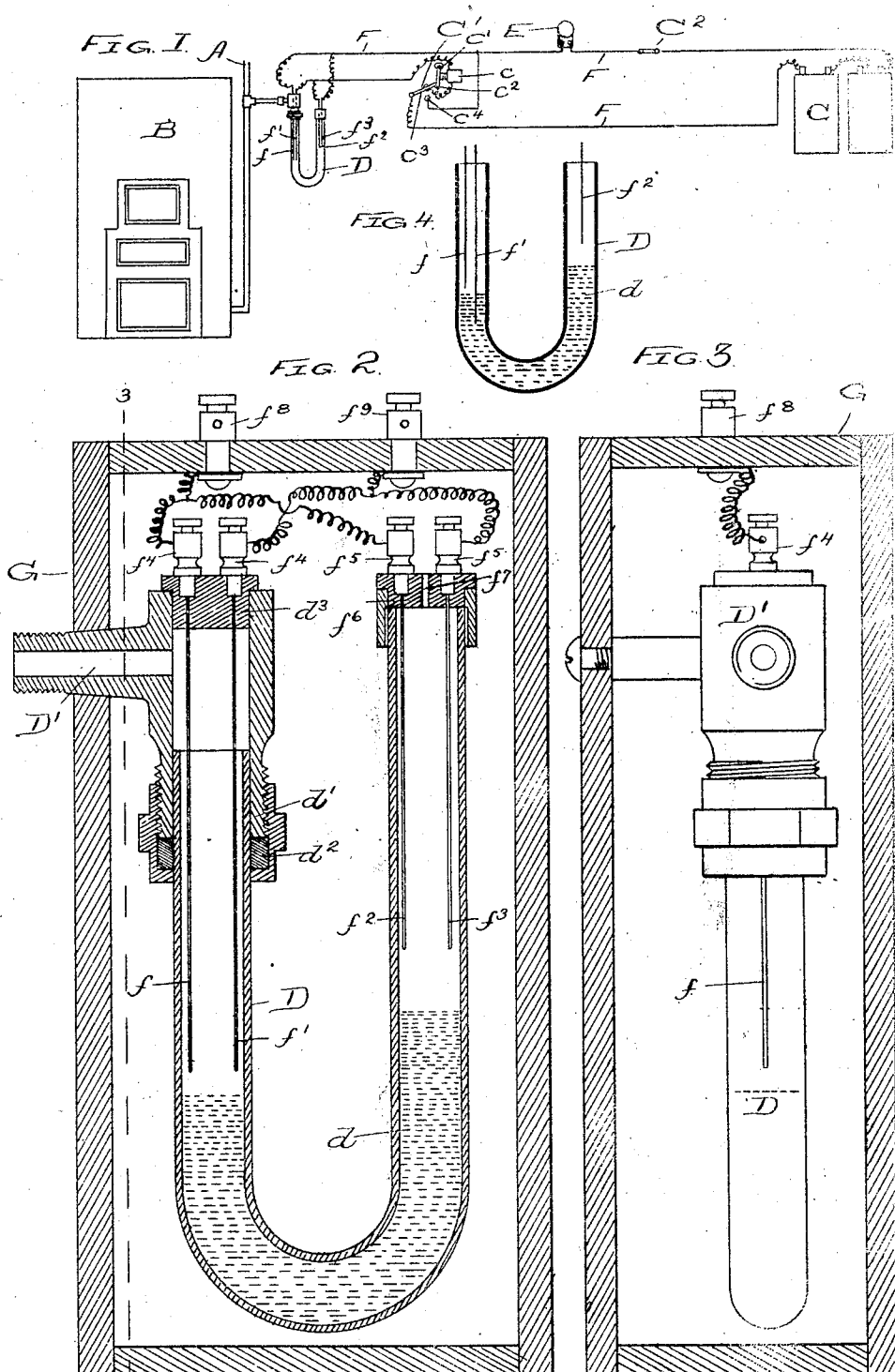


(No Model.)

F. S. BAKER.
PRESSURE ALARM FOR GAS PIPES.

No. 557,534.

Patented Apr. 7, 1898.



WITNESSES: 3
Lew. C. Lewis
H. M. Munday.

INVENTOR:
FRANCIS S. BAKER
Brillmuday, Brants & Adcock ATTYS.

UNITED STATES PATENT OFFICE.

FRANCIS S. BAKER, OF CHICAGO, ILLINOIS.

PRESSURE-ALARM FOR GAS-PIPES.

SPECIFICATION forming part of Letters Patent No. 557,534, dated April 7, 1896.

Application filed January 17, 1895. Serial No. 535,229. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS S. BAKER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Pressure-Alarms for Gas-Pipes and other Pipes or Vessels, of which the following is a specification.

My invention relates to devices for preventing explosions or other injury from abnormal variations in pressure of natural gas and other fluids supplied to houses and other buildings.

Heretofore the supplying of natural gas to the heating-furnaces of private houses, which are ordinarily left burning all night, and wherein all the inmates are, ordinarily, of course, asleep during the night, has been attended with more or less danger to life and property, owing to the possibility of the gas-pressure, on the one hand, rising to a dangerous degree, and thus so increase the fire as to melt down the furnace, burner, or heater, or set the house on fire, or falling so low, on the other hand, as to permit the fire to become extinguished momentarily, so that the house may fill with gas when the pressure returns, thus rendering possible an explosion.

The object of my invention is to provide a device of a simple construction, and which can be relied upon with certainty and safety, by means of which an alarm will be automatically given the moment the pressure either rises or falls to a dangerous degree, the alarm continuing until some person gives attention to the apparatus.

My invention consists, in connection with a supply-pipe for natural gas or other fluid, the furnace, heater, or other apparatus to which the gas or other fluid is supplied, and an electric alarm-bell, battery, and circuit, of an inverted siphon, bent tube, or two-limbed vessel connected at one end or limb to the supply-pipe and containing mercury or other liquid conductor of electricity, so that the level of the mercury in the siphon vessel will vary with the pressure, the terminals of the electric circuit being located within both limbs of the mercury-containing vessel, thus causing the circuit to be closed and the alarm rung by either a rise or fall of pressure to an extent considered dangerous, or to any extent

that may be predetermined upon and at which the apparatus may be set. In order that the alarm may continue to ring until the furnace, heater, or other apparatus receives the necessary attention, I provide the circuit with an annunciator-drop or other like device by means of which the alarm-bell circuit is kept closed until readjustment by the attendant, even though the circuit should only be momentarily closed by the variation in pressure of the gas or other fluid against the mercury in the inverted siphon or vessel.

While my invention is specially designed for use in giving alarms of dangerous variations of pressure of natural gas supplied to heating apparatus or other furnaces, it may, however, be used for giving alarm or notice of variation in the pressure of other fluids, liquids as well as gases.

In the accompanying drawings, which form a part of this specification, Figure 1 is a diagram view of an apparatus embodying my invention. Fig. 2 is an enlarged central vertical section through the mercury-containing vessel or device for automatically closing the alarm-bell circuit by the rise or fall of pressure of the fluid in the supply-pipe. Fig. 3 is a vertical section on line 3-3 of Fig. 2, and Fig. 4 shows a modification.

Like letters of reference indicate like parts in all the figures.

In the drawings, A represents a natural-gas or other fluid supply pipe; B, a furnace, heater, stove, or other apparatus to which the gas or other fluid is supplied; C, an electric battery or other source of electric energy; C', an annunciator-drop; C², a switch; E, an electric bell or alarm, and F an electric circuit. All these parts may be of any ordinary or well-known construction familiar to those skilled in the art.

D is an inverted siphon, bent tube, or two-limbed vessel, preferably made of glass and containing mercury or other conducting liquid *d*. The two-limbed vessel D is connected by a coupling or union D' with the gas or other fluid supply pipe A. The coupling is furnished with a nipple *d'* and packing-ring *d²* to form a tight joint with the coupling D'. The pressure of the gas or other fluid in the pipe A will thus press against the liquid or mercury *d* in one leg of the vessel D and hold

the mercury or liquid at different levels in the two legs of the vessel. The electric circuit F has two terminals ff' extending into one leg of the vessel or bent tube D, and preferably, also, two similar terminals $f^2 f^3$ extending into the other leg of the vessel, the terminals in the one leg being at a different level from those in the other leg, so that the circuit F may be closed by the mercury or other conducting liquid d between the terminals or contact-pieces f or f' when the pressure of the gas or other fluid ceases entirely or falls below the desired degree, and, also, so that said circuit may be closed by said liquid between the terminals $f^2 f^3$ when the pressure of the gas rises above the desired point or to a dangerous degree. The terminals or contact-pieces $f f'$ are attached to screws or binding-posts $f^4 f^4$ secured in a vulcanite or other insulating-plug d^3 , which closes the upper end of the coupling D', and in like manner the terminals or contact-pieces $f^2 f^3$ are secured to screws or binding-posts $f^5 f^5$ fitted in the plug or cap f^6 , which covers the upper end of this leg of the bent tube D. The cap f^6 has an opening f^7 through it, so that the mercury or other liquid in this leg of the bent tube may receive the atmospheric pressure.

$f^3 f^3$ are binding-posts for supporting the circuit-wires; and G is a box or case inclosing the bent tube or vessel.

In the modification illustrated in Fig. 4 the terminals ff' are made of different lengths, so that the single terminal or contact-piece f^2 will suffice in the other leg or branch of the bent tube. The terminals or contact-pieces $ff' f^2 f^3$ are preferably made of platinum wire or other metal not injuriously affected by the mercury or gas.

The bent tube or vessel D being itself open and in open communication with the fluid-supply pipe A, the liquid d in said vessel serves to close the opening through the vessel D and prevent the escape of the gas or fluid, as well as to close the circuit F when the pressure varies. For this reason I prefer to use mercury in the vessel D, as it is a very heavy liquid.

The annunciator-drop C' may be of any ordinary form. As indicated in the drawings, it comprises a magnet c in the circuit F, a pivoted armature-lever c' furnished with a catch c^2 , and a pivoted switch-lever c^3 , which closes the circuit F at c^4 when it is allowed to drop by the magnet moving its armature-lever c^3 . The bell or alarm E in the circuit F will thus continue to ring after the circuit is closed at ff' or $f^2 f^3$ by reason of the annunciator-drop C' keeping the circuit closed at $c^3 c^4$.

It will be observed that the two terminals ff' lead one to the binding-post f^4 and the other to the binding-post f^4 , and that the two terminals $f^2 f^3$ in the other leg of the vessel D lead in the same way to the two opposite binding-posts.

In the modification, Fig. 4, the increase of

pressure closes the circuit through the liquid d coming in contact with both the longer wire f' in one leg and the single wire f^2 in the other leg, and the fall of pressure closes the circuit between the wires ff' .

The small aperture f^7 at the free end of the bent tube—that is to say, the end that is not connected to the gas-supply pipe—also serves to prevent sudden fluctuations or pulsations of the pressure of the gas in the gas-supply pipe from causing the mercury to jump or act too quickly in the bent tube, and thus unnecessarily close the circuit and set the alarm in operation when the variation in pressure is only a momentary one and not one such as to produce danger. This small aperture at the free end of the bent tube, by furnishing a contracted escape or intake for the air in this end of the tube above the mercury, provides the apparatus with an effectual air-cushion to guard against unnecessary movements of the mercury.

I claim—

1. The combination with a furnace or gas-burning device and its gas-supply pipe, of an electric circuit, an alarm device included in the circuit, an annunciator-drop included in the circuit, a bent tube containing mercury or other electric conducting liquid, communicating at one end with the gas-supply pipe, and the free end of said bent tube having a small aperture to steady the movement of the mercury under fluctuations of pressure in the gas-supply pipe, and electric terminals or contact-pieces connected with said circuit and between which the circuit is closed by the mercury in said bent tube when acted upon by a change of pressure in the gas-supply pipe, substantially as specified.

2. The combination with a furnace or gas-burning device and its gas-supply pipe, of an electric circuit, an alarm device included in the circuit, an annunciator-drop included in the circuit, a bent tube containing mercury or other electric conducting liquid, communicating at one end with the gas-supply pipe, and the free end of said bent tube having a small aperture to steady the movement of the mercury under fluctuations of pressure in the gas-supply pipe, and electric terminals or contact-pieces connected with said circuit and between which the circuit is closed by the mercury in said bent tube when acted upon by a change of pressure in the gas-supply pipe, said bent tube having an electric terminal or contact-piece in each of its two legs or limbs, and at different levels in the two legs or limbs so that the circuit may be closed either by an increasing or by a decreasing change of pressure of the gas in the gas-supply pipe, substantially as specified.

FRANCIS S. BAKER.

Witnesses:

EDMUND ADCOCK,

FRANCIS M. BAKER.