

No. 621,623.

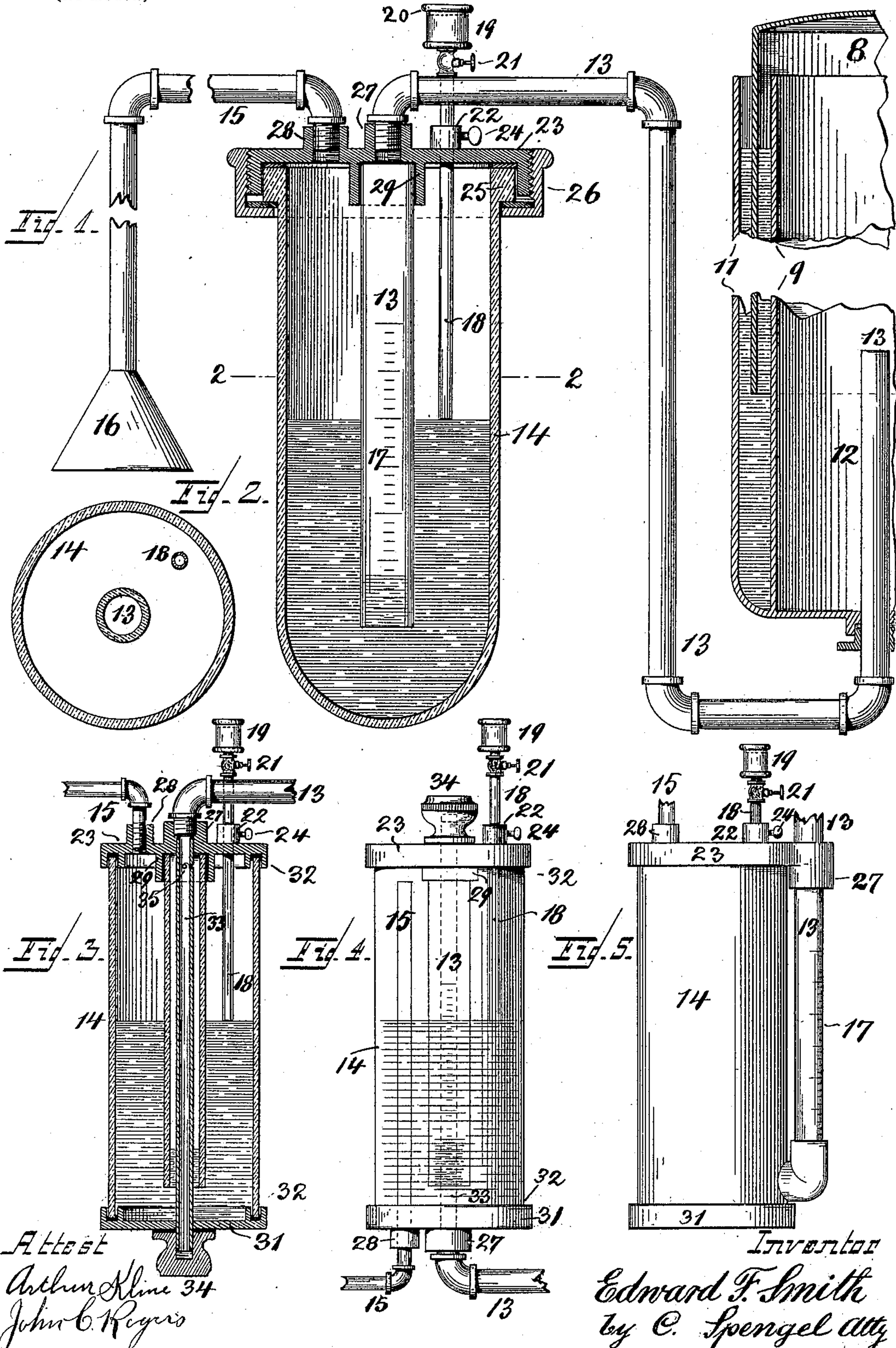
Patented Mar. 21, 1899.

E. F. SMITH.

SAFETY ESCAPE AND PRESSURE INDICATOR FOR ACETYLENE GENERATORS.

(Application filed Apr. 20, 1898.)

(No Model.)



UNITED STATES PATENT OFFICE.

EDWARD F. SMITH, OF CINCINNATI, OHIO.

SAFETY-ESCAPE AND PRESSURE-INDICATOR FOR ACETYLENE-GENERATORS.

SPECIFICATION forming part of Letters Patent No. 621,623, dated March 21, 1899.

Application filed April 20, 1898. Serial No. 678,242. (No model.)

To all whom it may concern:

Be it known that I, EDWARD F. SMITH, a citizen of the United States, and a resident of Cincinnati, Hamilton county, State of Ohio, have invented a certain new and useful Device for Controlling and Indicating Gas-Pressure; 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, attention being called to the accompanying drawings, with the reference-numerals marked thereon, which form a part of this specification.

This invention purports to be a pressure controlling and indicating device for gasometers or reservoirs containing gas or air under low pressure.

It is more particularly intended for gasometers containing generated gas like hydrocarbon or acetylene gas, and particularly the latter, and where such gasometers consist of an inverted vessel sealed by a body of water upon which it floats.

It frequently occurs that the generators supplying gasometers furnish more gas than is consumed by the burners, especially after these latter have been extinguished. This is particularly the case in some forms of acetylene-gas generators, which usually continue to produce gas as long as the unconsumed carbide of calcium in the generator lasts, whether such gas is absorbed by the burners or not. The unconsumed gas, therefore, fills the gasometer, which rises until its capacity is exhausted, after which the excessive pressure forces water as well as gas out between the water seal and the lower edge of the gasometer. This free escape of gas is not only objectionable on account of its odor, but furnishes also a source of danger by possible explosion.

The object of my invention is therefore to prevent such escape of gas into the rooms of a building, conducting the same instead, when the capacity of the gasometer has been exhausted, into the outer open air, where by dissemination it becomes sufficiently attenuated to be harmless. This is obtained by providing an outlet open at all times to the outer air and also in communication with the generator either directly or by means of any

of the service-pipes communicating with the generator. Passage through the outlet is controlled by means which balance the gas-pressure at a certain predetermined pressure, yield and permit escape of excess of same, and again cut off passage automatically as soon as the pressure has dropped to the normal stage.

An incidental feature of the construction whereby the object mentioned is accomplished is that under normal conditions it serves also as an indicator to show the pressure inside of the gasometer and permits regulation of such pressure.

In the following specification, and particularly pointed out in the claims, is found a full description of the invention, its operation, parts, and construction, which latter is also illustrated in the accompanying drawings, in which—

Figure 1, in a sectional elevation, shows at the left my pressure controlling and indicating device and at the right a part of a gasometer with which it is connected. This latter owing to its extensive size in proportion to the other parts is only shown in part. Fig. 2 is a horizontal section on line 2 2 of Fig. 1. Figs. 3, 4, and 5 show in sectional views simply possible modified constructions of the device, whereby the same objects may be accomplished.

8 indicates the upper part of a gasometer, being an inverted vessel dipping with its edges into a body of water contained between two walls 9 and 11, forming part of another vessel 12, which constitutes the lower part of the gasometer. This body of water forms a seal which prevents any escape of gas and permits at the same time the gasometer to adjust itself to the volume thereof. The gas is supplied from the generator, and as it enters causes the upper part of the gasometer to rise, whereby the latter either by its own or added weight is enabled to produce the necessary pressure to expel the gas through the service-pipes and move it to the burners. These parts are not shown in the drawings and form no part of my invention.

13 is an escape-pipe intended to carry off the gas when the producing capacity of the generator exceeds the storing capacity of the gasometer, and when the condition has ar-

rived when by reason of excessive pressure water forming the water seal or gas, or both, would force their way out through the water seal between walls 9 and 11. This pipe dips
 5 into another body of water contained in a vessel 14, which body of water prevents, however, under normal conditions any escape of gas until the pressure of the latter is sufficiently strong to displace the water within
 10 the lower part of pipe 13 within vessel 14, when the surplus of gas will pass out thereat and ascending through the body of water enters vessel 14 and from there escapes through another pipe 15 to the outside, where it can
 15 do no damage. At the same time the size of vessel 14 is so much in excess of the size of pipe 13 that the escaping gas is unable to force the larger body of water contained in vessel 14 out of the same, so that as soon as
 20 the excessive pressure is relieved the water-level assumes its normal position and automatically closes the gas-outlet. This point of outlet may be at any place where it is properly protected—as, for instance, under the
 25 eaves of a roof—and where the gas at once becomes diffused and part of the open air.

I prefer to provide at the outlet of the pipe an enlarged mouth in the shape of an inverted funnel, as shown at 16, to prevent closing of
 30 the same by ice which is apt to form thereat in freezing weather. It is evident that no escape of gas can take place until the pressure of it is capable of overcoming the weight of the volume of water within vessel 14, so that
 35 by the quantity of such water the pressure desired within the gasometer can be readily regulated. At the same time the position of the level of the water within the end of pipe 13 is directly dependent on the pressure of
 40 the gas, so that if such part of the pipe and vessel 14 are so arranged as to make the position of such level visible the device becomes also available as a pressure-indicator, for which purpose such vessel and part of the
 45 pipe are made of glass and the latter provided with a scale, as shown at 17. Vessel 14 is filled through a pipe 18, water being poured in until the level within glass pipe 13 balances the pressure of the gas at the desired
 50 point shown by the indicating-scale.

19 is a small storage-reservoir which is mounted upon pipe 18 and provided with a hermetically-closing cap 20, so that when filled and then closed by said cap and with cock 21
 55 open an automatic supply to vessel 14 is established, whereby any loss by evaporation is replenished and the level within the latter is maintained constant. This level depends, of course, on the position of the lower end of
 60 pipe 18, so that by adjusting such position the level within vessel 14, and with it the working pressure of the gas, may at any later time be regulated without interrupting the operation of the parts. For purposes of
 65 such adjustment pipe 18 passes loosely through a boss 22 on head 23 and is provided with a set-screw 24 to hold the pipe in its ad-

justed position. Vessel 14 with the means for connecting the pipes may be constructed in any suitable manner to serve the intended
 70 purpose.

In Fig. 1 vessel 14, with bottom and sides integral, is provided with a flange 25, to which the upper head 23 is connected by a coupling 26. Additional bosses 27 and 28 are provided
 75 for connection of pipes 13 and 15, respectively. On the inside of said head there is another boss 29 to receive the glass continuation of pipe 13. In Figs. 3 and 4 a lower head 31 is added, in which case the two heads 23 and 31
 80 are provided with grooved flanges 32, which receive, packed water-tight, the ends of a glass cylinder forming the side of vessel 14. In this case the two heads, with the glass cylinder between, are held together by a connect-
 85 ing-rod 33, which screws into one of the heads and protrudes through the other one, where a nut 34 is applied from the outside to complete the connection. This connecting-rod is hollow and forms practically a continuation
 90 of pipe 13, with outlets 35 below the upper head through which the gas passes into the glass portion of the gas-conduit 13. In Fig. 4 the construction is further modified by having pipes 13 and 15 connected to the lower head,
 95 in which case it becomes necessary to carry pipe 15 upwardly inside of vessel 14 to bring its intake above the water-level therein.

As shown in Fig. 5, the glass part of pipe 13 is arranged outside of vessel 14, in which
 100 case the latter need not be of glass.

It may be mentioned in general that the device must be so placed and connected as to be at all times in open communication with the open air and with the gasometer. For
 105 this latter purpose it is not necessary that a special pipe 13 be used to connect the device to the gasometer, and such connection may be to any one of the service-pipes of the system as long as such pipe is in direct and open
 110 communication with the gasometer.

In conclusion, as to the functions of the device the glass portion of pipe 13 within vessel 14 shows the level of the liquid within
 115 said pipe and with reference to the scale thereon indicates the pressure of the gas. Such pressure becoming excessive the water in said pipe is displaced and the gas passes out through it and rising through the liquid
 120 into the upper part of vessel 14 escapes therefrom through pipe 15 before the gas in gasometer 8 forces the water out between walls 9 and 11 or escapes itself therethrough, it being presumed, of course, that the body of water within vessel 14 is properly adjusted as to
 125 quantity, so as to yield before the mentioned contingencies in the gasometer take place. Within such limits the pressure of gas may also be regulated by the quantity of water in vessel 14. This water volume is automatic-
 130 ally maintained by the position of the lower end of fill-pipe 18.

In the forms illustrated in Figs. 1, 3, and 4 the scale might also be on vessel 14 and the

readings be had with reference to the level therein, which level is of course directly dependent on the position of the level within glass pipe 13. However, since the variations 5 of the level first mentioned are not so marked by reason of the larger size of vessel 14 and therefore not so readily observable I prefer the way shown.

I am aware of pressure-indicating devices 10 consisting of two pipes communicating with their lower ends and the water descending in one pipe and rising in the other indicating by the variations of the water-levels the pressure of the gas. Such devices are not suitable, however, for use as a safety-outlet in 15 the manner I use my device by reason of the small size of pipes and the water body, which latter by an excessive pressure would partly or all be forced out of the pipes. In my device by reason of the larger size of vessel 14 20 as against pipe 13 an excess of pressure could not force any part of the water out of vessel 14 and the body of water remains constant, balancing a certain pressure of gas, yielding 25 to any excess of same, and after permitting escape of such closes the outlet automatically and prevents escape of gas under normal pressure.

Having described my invention, I claim as 30 new—

1. The combination of a vessel consisting of a glass body with heads at each end to close it, a hollow connecting-rod attached to each head with a screw connection to hold them in place, a glass tube connected to the upper 35 head surrounding this hollow rod with a space between them and terminating above the lower head, an outlet-pipe from a gasometer communicating with this hollow rod, openings in this latter whereby it communicates with 40 the glass tube surrounding it, near the upper end of the same and an outlet leading from the upper part of the vessel to the open air.

2. The combination of a vessel containing a liquid body with its level at a certain height, 45 an outlet-pipe from a gasometer communicating therewith and having its outlet below said level therein, an outlet to the open air starting from said vessel above the liquid, an adjustable fill-pipe 18, the position of the lower 50 end of which determines the height of the aforesaid level of the liquid and a reservoir for the latter mounted on said fill-pipe and in communication therewith.

In testimony whereof I hereunto affix my 55 signature in presence of two witnesses.

EDWARD F. SMITH.

Witnesses:

C. SPENGEL,
ARTHUR KLINE.