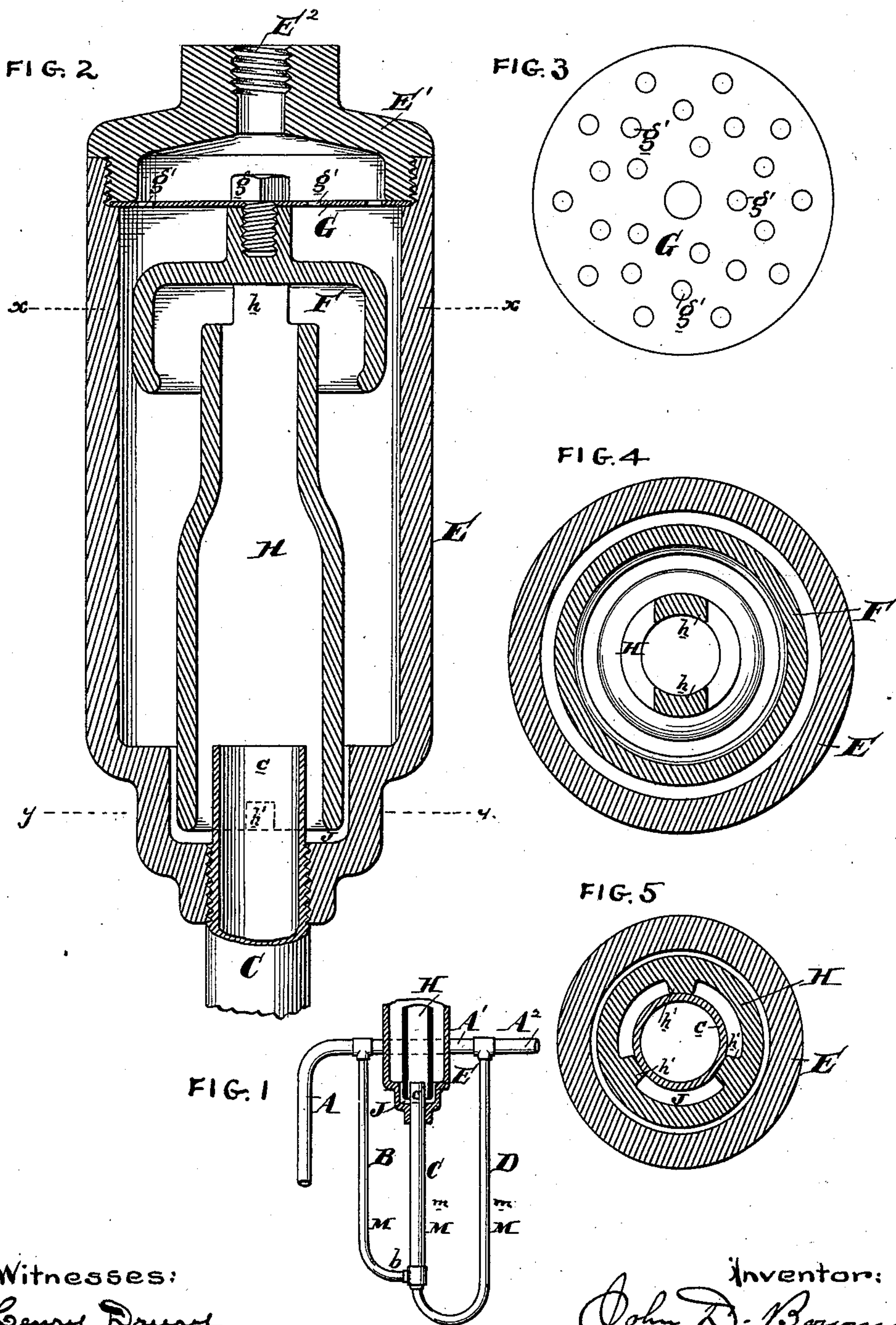


(No Model.)

J. D. BOWMAN.  
BLOW-OFF DEVICE.

No. 405,243.

Patented June 18, 1889.



Witnesses:

Henry Drury  
Joshua Matlack, Jr.

Inventor:

John D. Bowman  
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# UNITED STATES PATENT OFFICE.

JOHN D. BOWMAN, OF ALTOONA, PENNSYLVANIA.

## BLOW-OFF DEVICE.

SPECIFICATION forming part of Letters Patent No. 405,243, dated June 18, 1889.

Application filed November 6, 1888. Serial No. 290,076. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN D. BOWMAN, of Altoona, county of Blair, State of Pennsylvania, have invented a new and useful Improvement in Blow-Off Chambers for Fluid Safety-Valves, of which the following is a true and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to fluid safety-valves, such as are frequently used for preventing the pressure of gas in a conduit or apparatus from exceeding a predetermined amount and in which a U-pipe or an equivalent device containing mercury or other fluid connects the gas pipe or receptacle with a pipe opening into the air. When in this device the pressure of the gas is sufficient to depress the fluid in the connected leg to the bottom of the U, the gas will escape through the fluid in the other leg to the air. It is usual in this kind of apparatus to place in the leg of the U leading to the air a blow-off chamber, the function of which is to form a settling-chamber for the fluid carried up by the escaping air; and the object of my invention is to improve the construction and efficiency of this blow-off chamber, reference being now had to the drawings, which illustrate my invention, and in which—

Figure 1 shows the mode of use of my improved blow-off, the special device illustrated being a combined indicator and safety-valve for which I am about to apply for Letters Patent. Fig. 2 is a central sectional elevation of my blow-off chamber; Fig. 3, a perforated sustaining-plate; and Figs. 4 and 5, cross-sections on the lines *xx* and *yy*, respectively.

A in Fig. 1 represents a pipe for air or gas. In the device shown it is connected with a pipe-section A', and the section A' in turn connects with the delivery-pipe A<sup>2</sup>. B is a pipe leading downward from the gas-conduit, and C a pipe connecting with the bottom of pipe B at *b* and leading upward from said connection, so as to form with it a U.

D, Fig. 1, is a pipe leading from the bottom of pipe C upward and connecting with the gas-conduit.

E is the blow-off chamber secured to the upper end of pipe C, which upper end pro-

jects above the bottom of the chamber, as is shown at *c*, so as to form a chamber J between it and the walls of the blow-off chamber. For convenience in adjusting the interior mechanism, I provide this chamber with a screw-top E', through an orifice E<sup>2</sup> in which the gas escapes from chamber E.

F is an inverted cup secured in chamber E, so as to have its mouth over the opening of the pipe C. It may be held in position by any convenient device; but I prefer to secure it to a perforated sustaining-plate—such as G—which extends across chamber E and serves as an additional safeguard against the escape of fluid, as the gas passes through it only by perforations *g'*. The cup F is conveniently secured to diaphragm by a screw, as is shown at *g*.

H is a pipe secured in the chamber E, so that its lower end will extend around and below the end *c* of pipe C and into the chamber formed between *c* and the walls of chamber E. The upper end of pipe or tube H extends up toward the cup F and preferably enters it, as shown. The pipe or tube H must be sustained, so that it will leave an open passage both at top and bottom, a convenient device for holding it being lugs *h*, secured to the cup F. The cup and tube may of course be cast in a single piece, if desired. In order to hold tube H concentric with the pipe end *c*, lugs *h'* may conveniently be used.

M indicates the level of the mercury in the tubes when exposed to no pressure; *m*, its level in the pipes C and D when the pressure in pipe B is sufficiently great to depress the mercury to the point *b*.

The operation of the device is as follows: The U formed by the pipes B and C is filled with fluid, preferably mercury, to a height above the point *b* corresponding with the desired maximum pressure in the connected apparatus or conduit, the gas or air in which presses on the surface of the column in pipe B, depressing the mercury in that pipe and causing it to ascend in pipe C. When the pressure is sufficient to depress the column below the point *b*, the air or gas will escape from pipe B into pipe C and bubble up through the fluid in it on its way to the escape. Where a considerable volume of gas is thus escap-



ing, it tends to carry with it particles of the mercury or other fluid which it is important to prevent being lost. With this object I secure the chamber E on the end of pipe C, preferably making the end *c* extend up in the chamber, and filling the chamber J with mercury, thus sealing the passage between *c* and the tube H against gas, but leaving it open to permit the passage of mercury from the outside of tube H to the mouth *c*. The escaping air or gas then passes from C into tube H and issues at its top against the inside of the inverted cup F, which compels it to pass downward around its edges before it can escape to the upper part of chamber E. This reversal of the current of air or other gas tends to cause any particles of mercury to fall to the bottom of chamber E, and by using a perforated diaphragm—such as G—the subsidence of all the mercury is substantially insured, the gas escaping finally through opening E<sup>2</sup> entirely free from the fluid, which falls to the bottom of chamber E and unites with the mercury air-chamber J, passing from it over the edge of pipe end *c* into the U formed by pipes B and C. By sealing the passage between *c* and H with the fluid I prevent any current of air or gas from passing through it and producing upward currents in the lower part of chamber E to prevent the subsidence of the small particles of mercury. Even without this seal, as where the pipe C is not provided with an end *c* extending into chamber E, the tube H, which forms a practical continuation of pipe C, would prevent any very violent currents from being formed in the lower part of chamber E, and the device would be useful.

The pipe D (shown in Fig. 1) forms no part of my present invention, being a part of my other device of a combined indicator and safety-valve, which I am about to file an application for, and it is not therefore necessary to describe it and its uses here.

My improved device can be used in all cases where fluid safety-valves are used in gas-conduits.

Having now described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In combination with a safety-valve, consisting of a device in the nature of a U-pipe filled with mercury or other fluid, a blow-off

chamber secured on the end of one arm of the U, and having secured in it a cup F, with its mouth toward the opening of the U-pipe, and a tube H, extending between the pipe and the cup, substantially as and for the purpose specified.

2. In combination with a safety-valve, consisting of a device in the nature of a U-pipe filled with mercury or other fluid, a blow-off chamber secured on the end of one arm of the U, and having secured in it a cup F, with its mouth toward the opening of the U-pipe, a tube H, extending between the pipe and the cup, and a perforated disk G, arranged across the chamber above the cup, all substantially as and for the purpose specified.

3. In combination with a safety-valve, consisting of a device in the nature of a U-pipe filled with mercury or other fluid, a blow-off chamber secured on the end of one arm of the U, a chamber J, formed between the bottom of the chamber and an extension of the U-pipe entering it, a cup F, secured in the blow-off chamber with its face toward the opening of the U-pipe, and a tube H, secured in the blow-off chamber so that its lower end will surround the extension of the U-pipe and lie in the chamber J and its upper end extend upward into or nearly into the cup F, all substantially as and for the purpose specified.

4. In combination with a safety-valve, consisting of a device in the nature of a U-pipe filled with mercury or other fluid, a blow-off chamber secured on the end of one arm of the U, a chamber J, formed between the bottom of the chamber and an extension of the U-pipe entering it, a cup F, secured in the blow-off chamber with its face toward the opening of the U-pipe, a tube H, secured in the blow-off chamber so that its lower end will surround the extension of the U-pipe and lie in the chamber J and its upper end extend upward into or nearly into the cup F, and a perforated diaphragm G, arranged across the blow-off chamber above the cup, all substantially as and for the purpose specified.

JOHN D. BOWMAN.

Witnesses:

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CHAS. LINDSTRÖM.