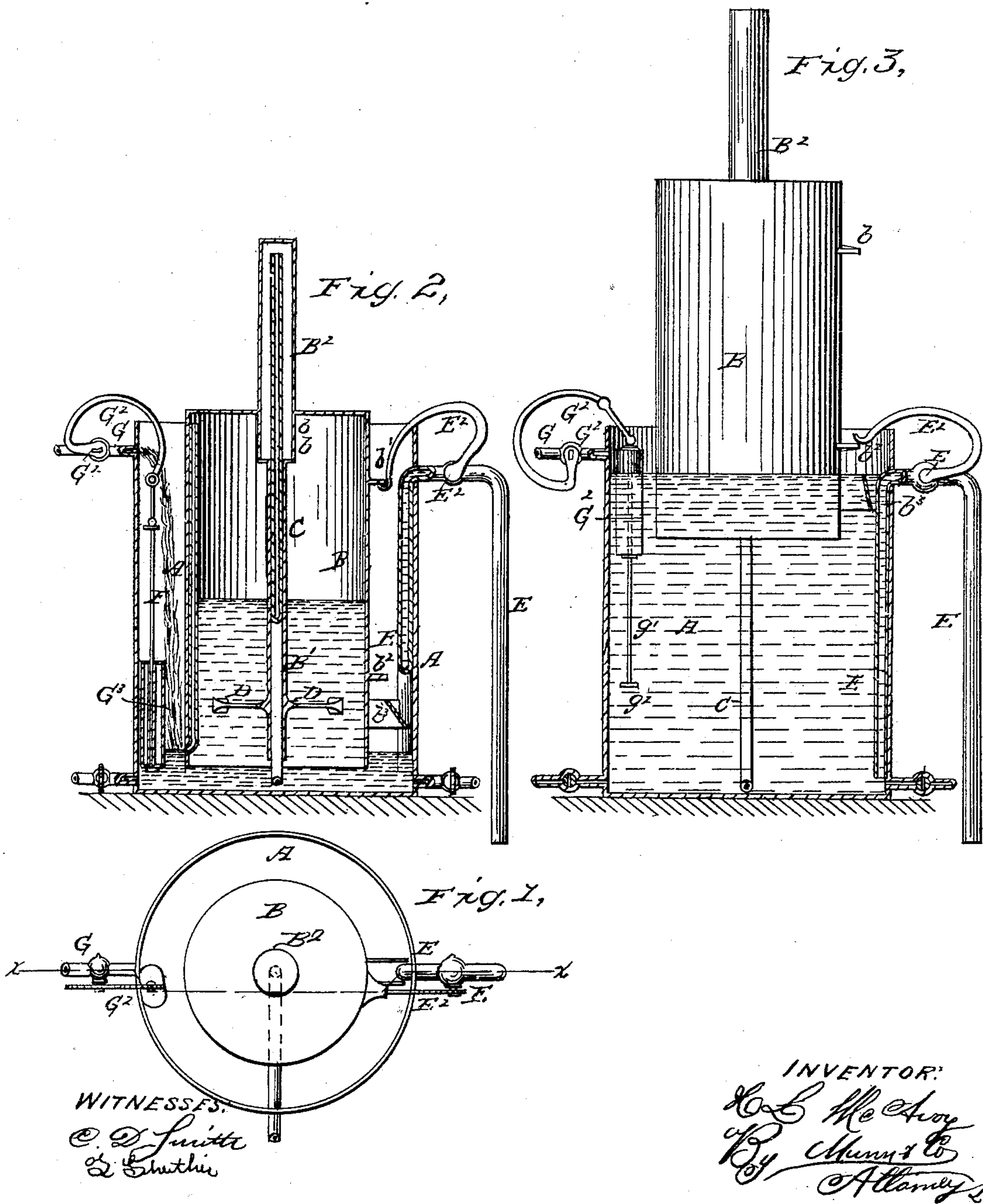


H. L. McAVOY.

Automatic Air Holder for Gas Apparatus.

No. 45,205.

Patented Nov. 22, 1864.





# UNITED STATES PATENT OFFICE.

HUGH L. McAVOY, OF BALTIMORE, MARYLAND, ASSIGNOR TO HIMSELF  
AND ELIAS HUTCHINSON, OF SAME PLACE.

## AUTOMATIC AIR-HOLDER FOR GAS APPARATUS.

Specification forming part of Letters Patent No. 45,205, dated November 22, 1864.

*To all whom it may concern:*

Be it known that I, HUGH L. McAVOY, of the city and county of Baltimore, in the State of Maryland, have invented a new and Improved Automatic Air-Holder for Gas Apparatuses; and I hereby declare the following to be a full and exact description of the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a plan of my improved apparatus. Fig. 2 is a vertical section in the line  $x x$ , Fig. 1, showing the air-holder proper in its lower position, and Fig. 3 is a similar view showing the holder in its elevated position.

Similar letters of reference indicate corresponding parts in the several figures.

The invention relates to an apparatus which is to be employed in connection with a generating device for manufacturing carbureted illuminating-gas. My object is to produce an air-holder which will keep itself constantly charged and supply the generator automatically.

In order that others skilled in the art to which my invention appertains may be enabled to fully understand and use the same, I will proceed to describe its construction and operation.

In the drawings, A is a vessel to contain a quantity of water, and B an air-holder, consisting of a cylinder open at bottom and closed at top, with a central vertical extension,  $B^2$ , to contain the air-discharging tube and guide C, which extends horizontally from the generating apparatus and passes through the side of the vessel A, near the bottom thereof. At the center of the vessel it is deflected, so as to rise within the same vertically through the air-holder B into a sleeve,  $B^2$ , which, fitting over the pipe C, acts as a guide and retains the holder in a vertical position. The sleeve  $B^2$  has the necessary rigidity given it by the braces D, which connect its lower end,  $B'$ , with the inside of the air-holder. The pipe C rises above the top of the vessel A to prevent the entrance of water from the latter, and the sleeve  $B^2$  extends upward to such height that a space will exist between the top of the pipe C and sleeve  $B^2$  when the air-holder B is in its lower position, as well as at other times. The lower and upper positions

of the air-holder are represented in Figs. 2 and 3, respectively. Small apertures  $t$  permit the air within the holder to pass therefrom into the sleeve  $B^2$ , and thence into the pipe C, to be conducted to the generator.

When the gravitating holder is placed in position, as in Fig. 3, its downward tendency forces the air into the sleeve  $B^2$ , and through the pipe C, to supply the generator; hence the air-holder gradually descends, and its descent continues until its lower end touches the bottom of the vessel A. As soon as the holder is arrested in its downward movement, it is charged with a fresh supply of air and caused to immediately ascend automatically.

I will proceed to describe the movements, commencing with the point shown in Fig. 3. The vessel A is filled to within a short distance of its top, and the surface of the water is on a level with or a little above the highest position of a pipe or siphon, E, which extends nearly to the bottom of the vessel A on the interior and below the bottom thereof on the outside, so as when open to act upon the well-known siphon principle. The pipe E is opened or closed by the turning of a cock or valve,  $E'$ . The holder B carries projections  $b'$   $b^2$ .  $E^2$  is a curved arm, which is attached to the valve  $E$ , and opens and closes the same by being turned in a vertical plane.

Now, as the holder B approaches its lower position, at which time it will be necessary to refill it in order to maintain the supply to the generator, the projection  $b'$  comes in contact with the free extremity of the arm  $E^2$ , and turns said arm, and thereby opens the valve  $E'$  and puts the siphon E in operation. On the opening of the valve  $E'$  the water within the vessel A is rapidly drawn off through the siphon and discharged at the outer and lower terminus thereof. The object in thus withdrawing the water is to open the lower end of a tube, F, whose upper opening is within the air-holder, near the top thereof, and the lower within the space between the air-holder and the vessel A. Inasmuch as the water which has displaced the air in the holder B is influenced by the pressure of the external air previously to the opening of the tube F, said water within the air-holder is not drawn off as rapidly as that between the walls of the air-holder B and of the vessel A, so that when this intermedi-



ate portion of water has fallen below the lower end of the pipe F the water within the holder is at a considerably higher level; hence after the end of the pipe E is open the air which passes in thereat not only supplies the holder B, but hastens the discharge of the water within it. The discharge by the siphon E continues until the surface of the water within the vessel A falls below the lower extremity of the inner end of the siphon E, when the latter, in consequence thereof, ceases to act, at which time the holder will have received a full charge of air through the tube F.

To cause the holder B to automatically rise within the vessel A to the position shown in Fig. 3, I employ an induction-pipe, G, adapted to discharge between the air holder and vessel, and operated in the following manner: A valve, G', in the pipe G is turned so as to open or close the pipe by an arm, G<sup>2</sup>. This arm has attached to its inner end a rod, g, the latter being suspended between the holder and vessel. Two disks, g' g<sup>2</sup>, are on the rod g. On the rod g, and between the disks thereon, is a float, G<sup>3</sup>, which may move vertically upon the rod with freedom. As the holder nears the limit of its downward movement, the float G<sup>3</sup> comes in contact with the disk g<sup>2</sup>, and acts upon the rod g and arm G<sup>2</sup> in such manner as to open the pipe G. This pipe is in diameter only about one-third that of the pipe E, and hence the siphon, notwithstanding the flow from this pipe, takes but a short time to exhaust all the water above its extremity within the vessel A. When the water is at or below this end of the siphon, the air, finding its way in the same, prevents its further action. After the siphon ceases to draw, the flow of water from the pipe G continues, and the holder, charged with air, rises to the position shown in Fig. 3. The float G<sup>3</sup> rises simultaneously with the air-holder, and when, in ascending, it strikes the disk g<sup>2</sup> the

arm G<sup>2</sup> is thrown back, the valve G' closed, and the flow of water stopped. The water rises in the siphon with no greater rapidity than in the vessel A, and the siphon is closed before the water reaches its uppermost horizontal part by the projection b<sup>2</sup> pressing upward the end of the arm E<sup>2</sup>. The holder B is prevented from turning or rotating by the projections b<sup>3</sup>, which rest against each side of the siphon E.

If at any time it be desired to charge the holder by hand, instead of automatically, the water may be drawn off by means of the cock H and supplied at the cock H'.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. An air-holder automatically charged and discharged by an eduction-siphon and an induction-pipe operated substantially as herein described.

2. The syphon E, having a valve, E', which is operated by the arm E<sup>2</sup> and projections b' b<sup>2</sup>, for the purpose of opening and closing the siphon, substantially in the manner and for the purpose herein set forth.

3. The pipe or tube F, adapted to be opened to the external air by the withdrawal of the water by the siphon E and to supply air to the holder B, as explained.

4. The induction-pipe G and valve G', the latter being provided with an arm, G<sup>2</sup>, which is moved by the float G<sup>3</sup>, so as to open and close the valve G', substantially as and for the purpose specified.

The above specification of my improvement in air-holders for gas apparatuses signed this 6th day of August, 1864.

H. L. McAVOY.

Witnesses:

CHARLES D. SMITH,  
JAMES H. GRIDLEY.