E. Dunscomb.

Carburetor.

No. 47,679. Patented May 9, 1865.

Fig. 6.

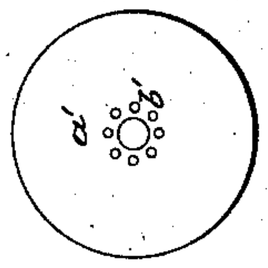


Fig. 7.

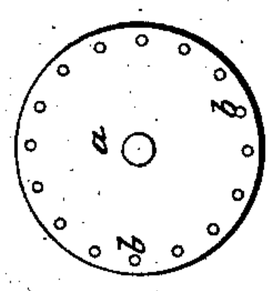


Fig. 4.

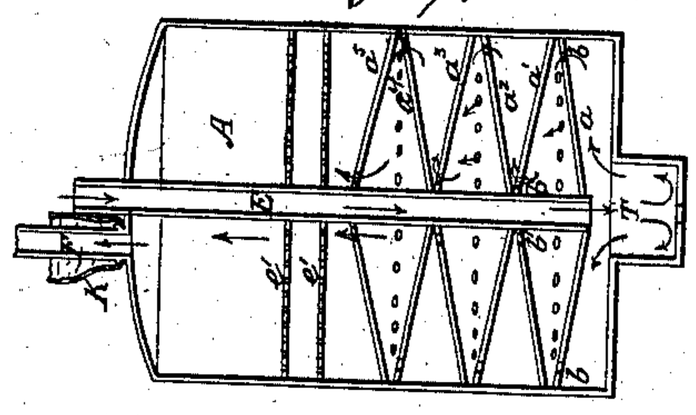


Fig. 1.

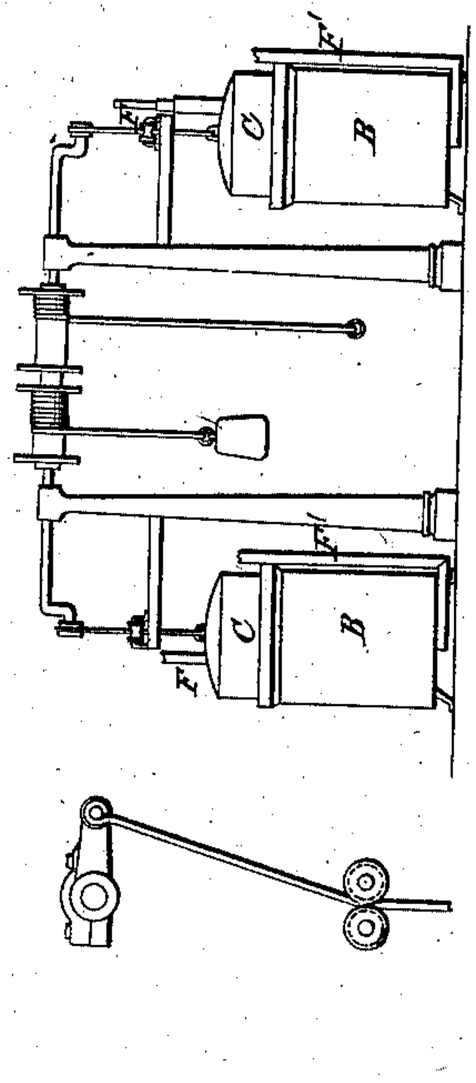


Fig. 3.

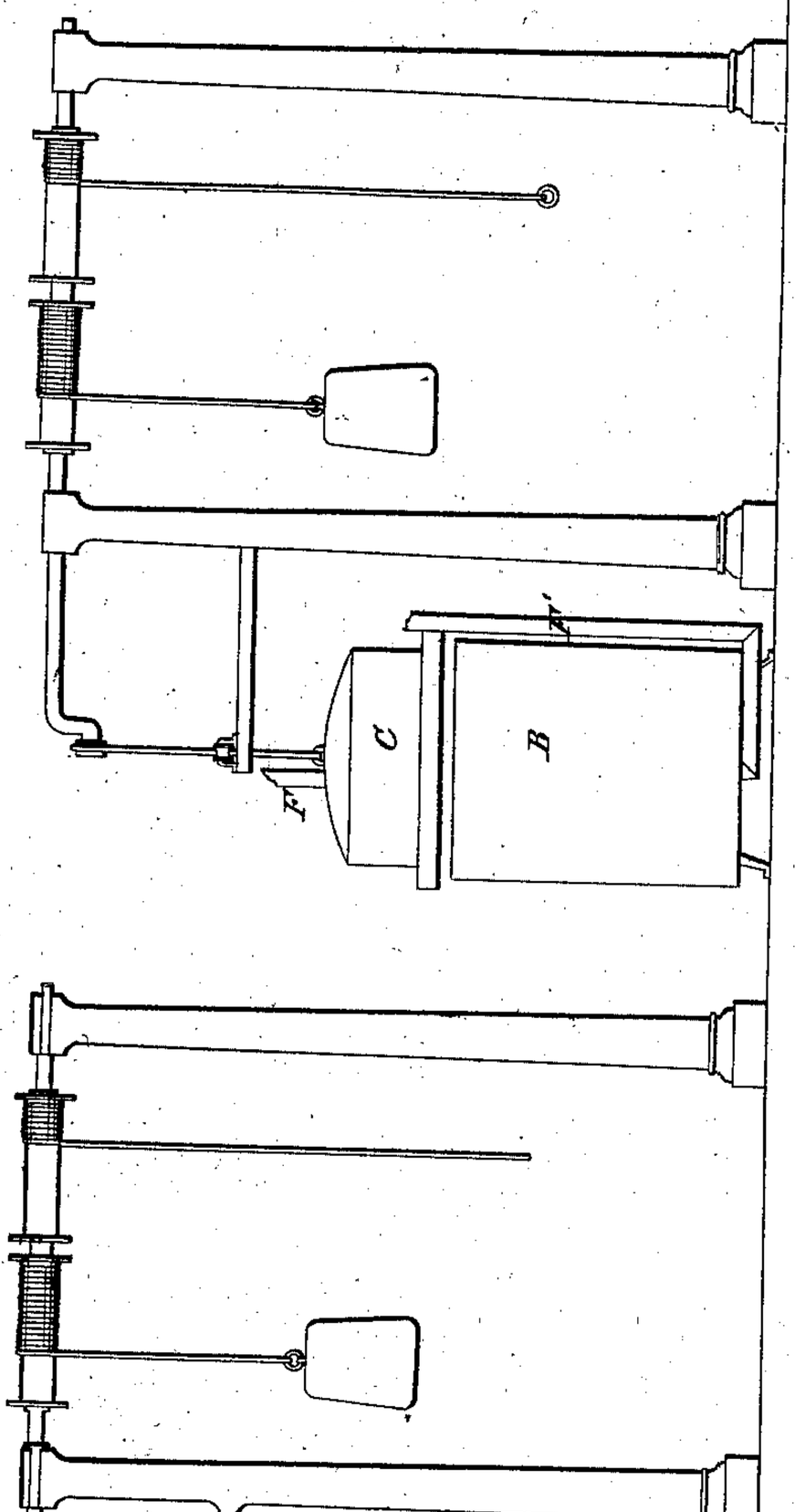
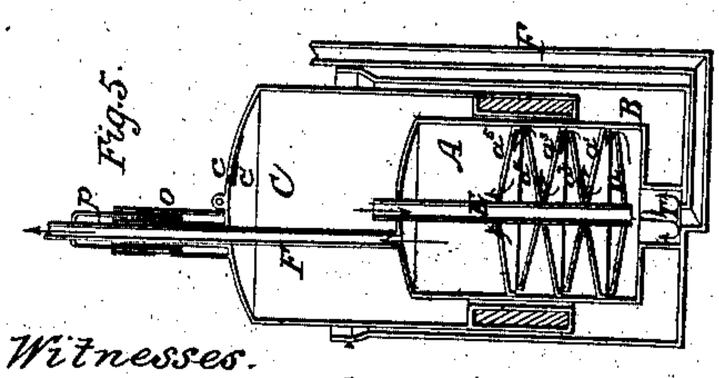


Fig. 2.

Fig. 5.



Witnesses.

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UNITED STATES PATENT OFFICE.

EDWARD DUNSCOMB, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO WILLIAM F. PERKINS AND L. L. FULLER, OF SAME PLACE.

IMPROVED APPARATUS FOR CARBURETING AIR.

Specification forming part of Letters Patent No. **47,679**, dated May 9, 1865.

To all whom it may concern:

Be it known that I, EDWARD DUNSCOMB, of Boston, county of Suffolk, and Commonwealth of Massachusetts, have invented a new and Improved Automatic Gas-Machine; and I do hereby declare the following to be a full and exact description of the same, reference being had to the accompanying drawings, of which—

Figure 1 is a side elevation of a machine constructed in accordance with my invention. Fig. 2 is a vertical section of one of the gas-generators or vaporizers, its air-bell or forcer, its cistern, and its motive mechanism. Fig. 3 is a side view of the same. Fig. 4 is a vertical section, on an enlarged scale, of the gas-generator. Fig. 5 is a vertical section of the gas-generator, showing a modified construction of the conical disks, to be hereinafter described. Figs. 6 and 7 are respectively top and bottom views of two of said conical disks.

My invention consists, first, of an improved air-forcing bell to be applied to the gas-generator or vaporizer; and, second, of the peculiar construction and application of the gas generator.

In the construction of automatic gas-machines heretofore air to be carbureted or impregnated with naphtha, hydrocarbon, or other carbureting substance has been forced into the generator or vaporizer by means of a bellows, air-pump, bucket-wheel, or meter-wheel, which by their motions or revolutions force the air into, through, or over the carbureting substance in the generator, for the purpose of making gas, as in the patents of O. P. Drake, August 30, 1853, May 6, 1862, and November 15, 1864; John Absterdam, June 15, 1858; E. S. Archer, September 6, 1864, and Levi Stevens, December 20, 1864.

My method of supplying an air-blast to the generator is entirely different from any of the above, as will be seen from the following description.

It consists in forcing the air into the gas generator by means of the inverted bell or air-holder C, as shown in Fig. 2 of the drawings, the power necessary to force the air down into the generator being obtained by the weight of said bell.

In the drawings, A, Fig. 2, denotes the generator or vaporizer; B, the cistern to hold water or other liquid into which the air-bell C is placed, thus making an air-tight joint. The air is taken into the air-bell C by means of a valve, *c*, in the top or crown of the bell C, said valve opening as the bell ascends and closing as the bell descends. To obtain the steady rise and fall of this bell, it is suspended from a crank at the end of a revolving shaft, said shaft being revolved by means of a weight attached to a cord wound round it. Each revolution of the shaft lifts the bell nearly to the surface of the water, from which position the bell, now charged with air, is allowed to descend nearly to the bottom of the cistern, forcing in its descent the air down into the generator A through tube E.

Fig. 1 represents a side elevation of two bells, described as above, placed in their respective cisterns and covering each their respective generators or vaporizers. Consequently each revolution of the shaft raises one bell nearly to the surface of the water in its cistern, and allows the other bell to descend to the bottom of its cistern. By the continued revolution of this shaft these operations are successively repeated, one bell receiving a renewed supply of air while the other is discharging.

This method of receiving, holding, and discharging air is different from that claimed in the patent of Hugh McAvoy, dated November 22, 1864, that patent claiming, in its own words, "an air-holder automatically charged and discharged by an eduction-siphon and an induction-pipe."

My air-bell or air-holder also differs from the one used by Simonds & Warner, which is described in their patent of March 24, 1863, as an air-holder supplied with air "by means of a force-pump or other mechanical arrangement," it being simply a reservoir for air forced into it by any means separate from the bell itself.

The filling of air-bells automatically by means of a valve, in connection with the alternate rise and fall of the bells by means of a shaft and weight, substantially as mine is described, is an important feature in my invention, and not before introduced or claimed.

My invention also consists of a new and improved generator or vaporizer so constructed as to force the air taken into it for a long distance through the naphtha, hydro-

carbon, or carbureting substance, thus thoroughly carbureting the air.

Fig. 4 is a vertical section of the generator on an enlarged scale. It consists of a hollow cylinder divided into several chambers by a series of cones, as hereinafter described.

A denotes a large chamber in the top of the generator. E is a tube, which opens through the top of the generator, extending a short distance up into the air-bell C, and descending nearly to the bottom of said generator. Through this tube E the air in the bell C is forced down into the generator. Surrounding this tube E is a series of cones or conical disks, *a a'* a^2, &c., placed base to base and apex to apex alternately. The lower conical disk, *a*, is perforated with small holes *b* near its circumference, as shown in Fig. 7. The conical disk *a'*, next above it, is perforated with small holes *b'* near its center and round the tube E, as shown in Fig. 6. The next conical disk, a^2, is perforated in manner similar to *a*, and so on alternately. The air-bell C, descending, forces the air down through the tube E and under the lowest conical disk, *a*. From thence the air rises through the perforations *b*, spreading as it rises over the lower surface of the conical disk *a'*, next above it. Passing through the holes *b'*, it continues to rise, escaping in the same manner through the perforations in each succeeding conical disk till it reaches the chamber A in the top of the generator and is carried off through pipe F to the burners. This arrangement of conical disks so perforated, the perforations alternating in the several disks from center to circumference, obliges the air to cross and recross through the hydrocarbon liquid, and the air becomes thus thoroughly saturated or impregnated with the hydrocarbon. This arrangement also enables me to obtain a very large surface for carbureting the air within a short vertical distance or with but small depth of hydrocarbon fluid, requiring but small power to drive the air down through the hydrocarbon in tube E. From thence the air ascends in minute particles, passing backward and forward over and under the entire surface of each conical disk till it reaches the top of the generator. By this method I obtain far more carbureting-surface than any machine now used with equal propelling-power and equal depth of hydrocarbon, and can use a denser hydrocarbon than has been used heretofore. By this method I am enabled to manufacture gas from crude petroleum, instead of the products of its distillation.

The application and construction of the conical disks may be varied, as shown in Fig. 5. In this case, instead of air passing through the outer row of perforations in conical disk *a*, it passes under its edge, thence upward to the conical disk *a'* above it, passing through the perforations in its center or apex. The upper conical disk in each case is made with an overhanging flange.

Another feature in my generator consists in the method of taking the gas from the top of the generator. Most gas-machines take it out below, thus requiring an increased pressure of air to force the gas downward, which by the laws of gravity would naturally rise. To take the gas from the top of the generator, passing the same through the top or crown of the air-bell C, an air-tight joint is required around gas-pipe F. I employ for this purpose a flexible tube, K, Fig. 2, made of cloth or material capable of being made air-tight and resisting the action of water or other fluids, said flexible tube to be secured to the top of the generator and to the top of the air-bell, and to be of sufficient length to allow the upward and downward motion of the air-bell over pipe F. Instead of this arrangement, when more desirable, I use a method as shown in Fig. 5. Secured to the top of air-bell C is a deep annular cup, O, surrounding the gas-pipe F, and secured to the top of air-bell C. Into this cup O an inverted thimble, P, secured to pipe F, enters. This annular cup O, filled with water or any liquid, makes, with its inverted thimble P, surrounding pipe F, an air-tight joint, thus preventing the escape of air from the bell C, and is similar in operation to the bell C and the cistern B, reversing the motions.

The generator is fed with hydrocarbon through pipe F', the pipe commencing at a point above the level of the hydrocarbon in the generator, which pipe F' passes down near the side of the cistern B, thence up through the bottom of cistern B into the bottom of the generator. Supply-pipe F' at its lowest point is provided with a stop-cock, for the purpose of emptying the generator.

The lower part of the generator is made with a small cistern, T, which, being filled with hydrocarbon, forms an air-cushion, enabling the air to be easily forced down and out of the tube F, to ascend through the conical disks *a a'* a^2, &c., as shown by the arrows about T. If the tube E came down close to the bottom of the generator, with no cushion for the air to strike against, the passage of air would be impeded. To remedy this evil, by raising the conical disks a greater distance from the bottom of the generator and shorten the tube E a larger quantity of hydrocarbon must be used, through which the air would not pass, and consequently for the purpose of making gas would be useless, besides increasing the size, and therefore the cost, of the machine.

Not only is the construction of my generator different from that claimed in the patent of Levi Stevens, dated December 20, 1864, but the application is also different. That invention consists of a hollow cylinder containing two disks, one flat and horizontal placed near the bottom, the other conical and placed near the top, the entire surface of both disks being full of small perforations. Between these two disks are several layers of cloth. Passing up through the center of this

cylinder, through the centers of these disks, and through these layers of cloth, is a tube, which opens through the top disk, and in the words of that patent, "is for discharging the hydrocarbon liquid directly upon said top, which, being conical, allows the liquid to flow radially from the tube and fall through the numerous perforations of the top (disk) in fine streams, and on strata of cloth piled on the perforated bottom (disk) * *, there being below said bottom and constituting part of the vaporizer an air-chamber," &c.

My generator or vaporizer differs from the above as follows: It consists of a hollow cylinder containing a series of cones or conical disks placed base to base and apex to apex. Passing through the center of this cylinder, through the centers or axes of these cones or conical disks, is an air-tube, E, down which the air in the bell C is forced, said tube E extending downward and opening through the lower surface of the bottom conical disk, *a*. The entire surface of this conical disk *a* is not full of small perforations, like the disks in Stevens' vaporizer, which would allow the air to rise directly up, as it does in Stevens' vaporizer, but a line of perforations only are made surrounding or following the edge or the circumference, as in Fig. 7, thus obliging the air to cross through the hydrocarbon liquid, covering the entire surface of said conical disk, in order to escape through the perforations near its circumference. The next conical disk above it, *a'*, having a line of perforations surrounding its center and round tube E, as seen in Fig. 6, again causes the air to pass through the hydrocarbon, covering the surface of that disk, so that in no instance can the air rise in a direct line. By this process, the perforations even being at the highest point, and thus alternating in the several disks, obliging the air in its ascent to cross and recross through the hydrocarbon, filling each chamber, and thus covering the surface of each conical disk, the air becomes much more thoroughly carbureted than it would in the direct ascent. By this comparison of the two vaporizers or generators it is shown that to perforate the entire surface of the cones or conical disks in my vaporizer, like the "top and bottom" of Stevens' vaporizer, would defeat the object aimed at in the construction of my vaporizer. The top of Stevens' vaporizer is made conical, "to allow the fluid to flow radially," &c.

The disks in my vaporizer are made conical to cause the air to ascend, which, in crossing from center to circumference to escape through the perforations in each succeeding disk or partition, would lodge under said disks were they flat and horizontal.

In the construction of my vaporizer so large a carbureting-surface do I obtain for the passage of air that the air becomes sufficiently carbureted for great illuminating-power without the use of either saturated cloth or wire-gauze, and I thus dispense with the use of two auxiliaries much employed in gas-generators.

My method of taking the gas from the top of the generator and through bell C, as hereinbefore described, also differs from generators heretofore constructed. I am not limited, however, to this method, but can take it from the generator in any of the usual modes.

The recess T, forming an air-cushion, as hereinbefore described, is also a new invention, and for the purposes mentioned of great use.

Having given a description of my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. The employment of the two air-forcing bells, filling alternately and automatically, thus supplying a constant air-blast, as hereinbefore set forth.

2. I do not claim the arrangement and application of the perforated conical top and the perforated horizontal bottom, as shown in Patent No. 45,568, and dated December 20, 1864; but I claim the arrangement and application of the cones and inverted cones *a a' a²*, &c., placed base to base and apex to apex, with the lines of perforations *b b'*, Figs. 6 and 7, alternating from center to circumference, essentially in manner and to operate as before explained.

3. The application of the air-tube E in the generator, to conduct the air through the top of the generator to the recess T at the bottom, to operate as before described.

4. The recess T at the bottom of the generator, making an air-cushion, as before described.

5. Taking the gas from the top of the generator through the air-bell C by means of an air-tight joint made by the annular cup O and the inverted thimble P, Fig. 5, substantially as hereinbefore described.

EDWARD DUNSCOMB.

Witnesses:

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