M. P. COONS.

Making Wood Gas.

No. 26,163. Patented Nov. 22, 1859.

Fig. 1.

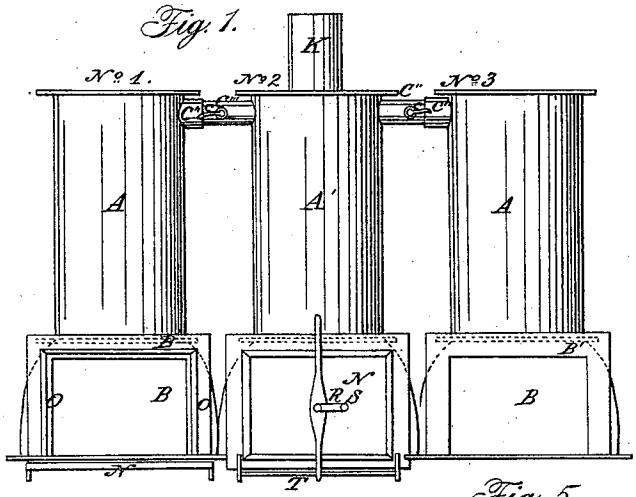


Fig. 2.

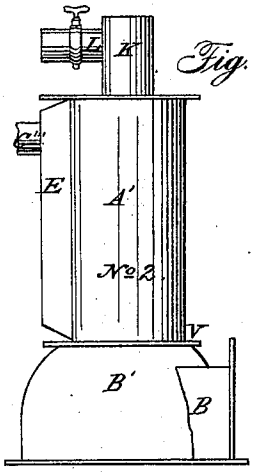


Fig. 3.

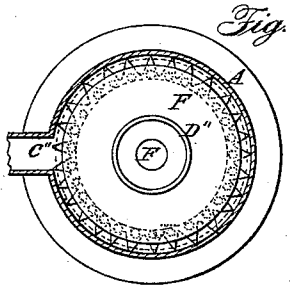


Fig. 5.

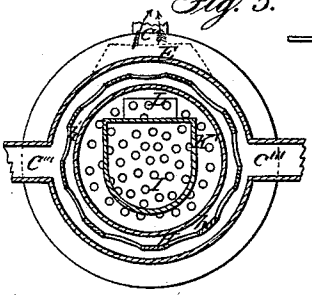


Fig. 7.

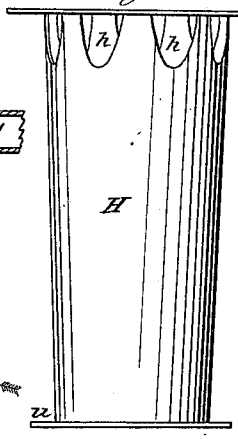


Fig. 4.

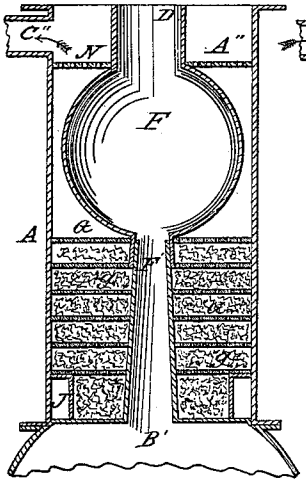


Fig. 6.

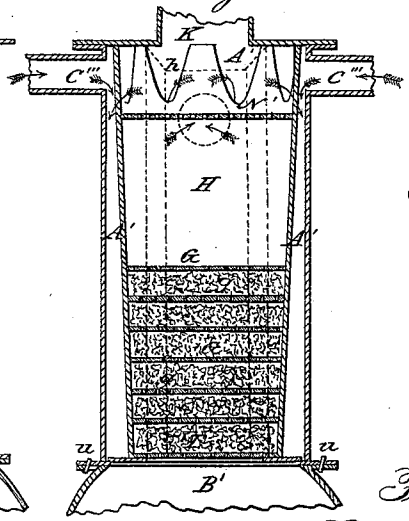


Fig. 8.

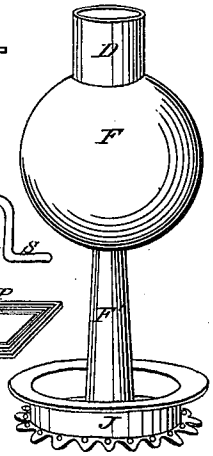


Fig. 10.

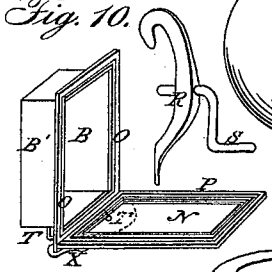
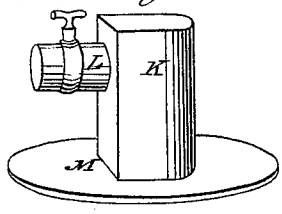


Fig. 9.



Witnesses:

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Inventor:

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AM. PHOTO-LITHO. CO. N.Y. (OSBORNE'S PROCESS)

UNITED STATES PATENT OFFICE.

MATTHIAS P. COONS, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN APPARATUS FOR GENERATING ILLUMINATING-GAS.

Specification forming part of Letters Patent No. **26,163**, dated November 22, 1859.

To all whom it may concern:

Be it known that I, MATTHIAS P. COONS, of the city of Brooklyn, county of Kings, and State of New York, have invented a new and useful Improvement in Apparatus for Generating and Combining Illuminating and other Gas, of which the following is a specification.

By the construction and arrangement of this invention it is designed to be portable and general in its application, and also for being made of any desired size or capacity for generating gas, and while in operation it is not attended with any offensive odor. It also is extremely simple in its construction, and may be operated by any person of ordinary physical and mental capacity, and consequently may be made suitable for private dwellings, public buildings of all classes, villas, villages, cities, &c.

By practical and experimenting tests the following advantages were discovered and claimed:

First. The apparatus in its combination is simple, requiring comparatively little space.

Second. It is cheap, afforded at less cost than any other according to its capacity.

Third. It requires less fuel.

Fourth. Gas may be generated from all known combustible materials without changing retorts.

Fifth. Different kinds of gas may be generated at the same time, and at the same time are chemically combined.

Sixth. While in operation no offensive odor escapes, whatever may be the material used or however offensive the smell before its being introduced into the apparatus.

Seventh. By the internal arrangement, as will be seen, it affords the greatest possible amount of superficial heating-surface.

Eighth. After gas has been generated and passed from this apparatus no other purifier is required other than water, and still other advantages, as will more fully appear hereinafter.

I hereby declare that the following is a full and clear and exact description of the construction and operation of the invention, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1, letters A A′ A and Nos. 1, 2, and 3, is a perspective view of the apparatus, which consists of three distinct and separate gas-retorts. In combination they constitute and form one gas-generator. Fig. 2, A E is a perspective view of the center or middle retort, having a port attached E. Fig. 3 is a transverse section of the internal arrangement of Fig. 2. Fig. 4 is a vertical section of the internal arrangement of Nos. 1 and 3 and letter A. Fig. 5 is a transverse section of No. 2 and A′. Fig. 6 is a vertical section of the internal arrangement of No. 2 and A′. Fig. 7, H, is a longitudinal elevation of the chamber within No. 2 and A. Fig. 8 is a longitudinal elevation of chamber and diaphragm of Nos. 1 and 2 and A. Fig. 9 is a perspective view of cover M to No. 2 and A, with chamber K and the escape-pipe L attached. Fig. 10 is a perspective view of mouth-piece of retorts with door attached.

R S are the bar or yoke and screw as used for closing and holding the doors of the mouth-piece retorts.

It will be seen that each retort consists of a fusion-chamber and a cylinder or barrel, both of circular form, and are each supplied with suitable projecting rims or flanges, (marked V.) Barrel A′ and fusion-chamber B are united by their respective rims V by suitable screw-bolts. Upon the inner and lower end of the barrel is also a projecting flange upon which rests the diaphragms, Figs. 7 and 8. The barrels A have like flanges or rims at their upper ends, to which the covers are attached in the same manner as the fusion-chambers and barrels are united. After having united the fusion-chambers and barrels, the retorts are then placed over a suitable fire-chamber, or furnace, or stove in the order as represented by Fig. 1, A A A, Nos. 1, 2, and 3. I then insert the diaphragms in Nos. 1 and 3, a circular perforated plate resting upon a scalloped rim or ring, as represented by J, Fig. 8, which leaves a space surrounding the inner circle of the barrel, as represented by J, Fig. 4. Attached to and forming a part of this diaphragm is a vertical section of a pillar or tube, as represented by F′, after which a sufficient quantity of cellular packing consisting of small particles of metallic or earthy matter. The circular or globular chambers are now inserted, as represented by F, thereby leaving a narrow space around the chamber and inner side of the barrel, as represented by F, Fig. 4. This chamber F has upon

its upper end a section of a tube which extends upward and even with the upper edge of the barrel, as represented by D. The lower side of the cover has a corresponding groove to receive the upper end of tube D″, Fig. 3, the perforated plate N fitting the inner circle of the barrel and resting upon the globular chamber, thus forming a chamber surrounding the tube between the plate and cover, as represented by A″.

Fig. 2, No. 2 and A, is the side elevation of the middle or combining retort, and at the same time is a gas-generating retort, as will be seen, that by its arrangement the gas generated in Nos. 1 and 3 is discharged into No. 2, while at the same time gas is also being generated within, and the gas generated in each of the retorts all unite in the center barrel and are there chemically combined, as will more fully appear hereinafter. The middle or center barrel has attached a port or conduit extending vertically the length of the barrel. At the lower end of this barrel is an aperture opening into this port E, and at the upper end of this port is an aperture for the admission of the discharge-pipe. Within this barrel (No. 2) is placed the chamber, Fig. 7, H, extending its length, having at its base a flange or rim projecting outwardly, and fitting the inner side of the barrel is also another flange projecting inwardly, a portion of the upper end being pronged, perforated, or scalloped, the prongs of which fitting in a corresponding groove in the lower side of the cover, as shown by *h h*, Fig. 7. The lower end of this chamber is supplied with a perforated plate or diaphragm, as represented by I, resting upon the inner flange, after which it is also supplied with cellular packing and alternate perforated plates, as represented by *a* I I, Fig. 6. Near the upper end and below the projections or prongs is another perforated plate, represented by N. Upon either side of the barrel No. 2 are holes surrounded by collars or sleeves, and the same upon the one side of Nos. 1 and 3, to which the connection-pipes C‴ are attached and which unite the retorts, and also produce a communication from and to one another for the purpose of chemically combining gases, as hereinafter set forth.

Upon the upper side of the cover of No. 2 is a chamber communicating with the chamber beneath, being of any desired size or form, as represented by Fig. 9, letter K, it having a suitably-sized pipe attached, communicating with the smoke-stack or chimney, having a stop-cock between the chamber and chimney, as represented by L. The mouth-pieces of the fusion-chamber of the retorts have a projecting rim or flange surrounding their outer edge, (of required width,) as represented by O, Fig. 10, and surrounding the mouth-piece B, at the bottom of which is a projecting plate or hearth, as represented by T, which is placed there for a twofold purpose: first, to form a rest for the door of the retort, represented by N, Fig. 10; second, it has a mortise near the mouth for the admission of the tenon of the bar or yoke R. The facing-surface of this rim is an inverted-Λ-formed projecting ridge extending around this rim, as represented by *o*, the door N being in form to fit the mouth of the retort, as described by B. The door N has upon its outer edge a projecting flange made to fit and cover the outer edge of the flange or rim-plate O, and upon the inner side is a groove P, corresponding in form to the ridge Λ inverted (thus, V) on rim O. The door has attached two hook-formed hinge-bars, which when prepared are to be used for closing the mouth-piece. These hook-bars rest upward and against the lower projecting section of the rim O, as shown by *x*, thus resting horizontally upon the hearth-plate T, and, as will be seen by this arrangement the mouth of the retort is closed instantaneously.

Suitable vessels or pans are provided for receiving the materials (charges) from which gas is generated, and this consists of wood and fatty matter, or other suitable materials may be used. Two pans are charged with wood and one with pulverized charcoal, bituminous coal, sawdust, &c., but I prefer charcoal, with which is mixed a suitable quantity of fat, oil, or resinous matter, or a compound of the same.

The retorts having been prepared and arranged as represented by Fig. 1, A A A, and provided with a suitable fire-chamber, and the covers all being secured and arranged as described, the connection-pipes C‴ are inserted and secured, either with or without stop-cocks, the escape-pipe with stop-cock communicating with and attached to the chamber, Fig. 9, K, and leading into the chimney, and also the required discharge-pipe C inserted into the upper end of the port E, Fig. 2, by which the gas generated is conducted direct into the cooling-tank and from thence into the gas-holder.

Having thus arranged the apparatus as described and prepared for operation, and the bottom of the fusion-chambers having attained a red heat, the grooves V in the doors are filled with suitable packing and placed in the manner heretofore described, the stop-cock in the escape-pipe being open. The charges are then inserted and the doors alternately closed and secured by the yoke or bar and screw-crank, the tenon of the yoke or bar R being inserted in the mortise in the hearth T, the upper hook end grasping flange O, and by means of crank-screw S the door is firmly secured to the mouth-piece, thereby producing an air-tight joint. After the doors are thus closed the stop-cock in the escape-pipe is closed, and the gas generated is then conducted into the cooling-tank D, by which process no offensive odor is emitted from the retorts, but escapes into the chimney.

I will now proceed to describe the process by which a plurality of these retorts are

charged continuously while being heated to the required temperature without emitting any unpleasant odor or unhealthy gaseous vapors escaping into the apartment. First, after the first charges are consumed the stop-cock L is opened, the screw-crank S is tightly receded, and air is permitted to enter the fusion-chambers, and after remaining in that situation a short time the doors are then removed and the charcoal, coke, &c., are withdrawn. The charges and doors having been prepared previously, the charges are then inserted and the doors closed, all in the same manner as in the first instance, and the stop-cock L again closed, as before described. Thus it will be seen that the process of generating gas may be continued indefinitely without loss of fuel or time.

I will now describe the process by which it escapes from the retorts after being generated, reference being had to the drawings as represented by Figs. Nos. 4 and 6, by which it will be seen that in Nos. 1 and 3, A, it passes from the fusion-chamber upward through the perforated plate, thence through the cells of the cellular packing, thence upward through the narrow space between the circular chamber F and inner side of the barrel, and thence through the perforated plate N and into the chamber A′, and thence into and passing through the connection-pipes C‴ into the chamber A″ of retort No. 2. The gas generated in retort No. 2 passes upward from the fusion-chamber B through the perforated plate I, thence through the cells of the cellular packing and series of perforated plates G *g*, and thence through the perforated plate N and into chamber A‴, at which point the gases from Nos. 1 and 3 become amalgamated, as shown by Fig. 6, H. Thus concentrated and mixed the combination is then forced through the apertures H H, Fig. 7; thence down the spaces surrounding the chamber H to the bottom flange U; thence into the port E, No. 2, A′; thence up to the discharge-pipe C, and thence into the cooling-tank, and thence into the gasometer or holder, thus chemically combining the different kinds of gas for illuminating purposes; and by this process it will be observed that all the gases generated are subjected to the greatest attainable superficial heating-surface before being discharged from the apparatus.

Having thus described the nature of my invention in its mechanical construction and arrangement and its chemical operation, what I claim as my invention, and desire to secure by Letters Patent, is—

1. The particular form and manner of constructing and combining a gas-generating retort, consisting of a fusion-chamber and barrel, as represented by Fig. 1, A, Nos. 1 and 3, as combined for the purpose specified.

2. The diaphragm J, in combination with the chambers F and D and diaphragm N, as represented in Fig. 4, in the manner and for the purpose specified.

3. The chamber H, Fig. 7, constructed as and in combination with the other apparatus specified.

4. The chamber K, Fig. 9, as attached to the cover M, in connection with the escape-pipe L, with a stop-cock or its equivalent attached in the manner and for the purpose specified.

5. In combination with the apparatus specified, the projecting ridge or facing rim or flange O, and the corresponding groove P in the door N, and also, in combination, the yoke or bar R and crank-screw S, as combined, and also the hook-hinges X, all of which is represented by Fig. 10, all of which is herein set forth and specified.

MATTHIAS P. COONS.

In presence of:
J. B. BULLOCK,
EDWD. HUNT.