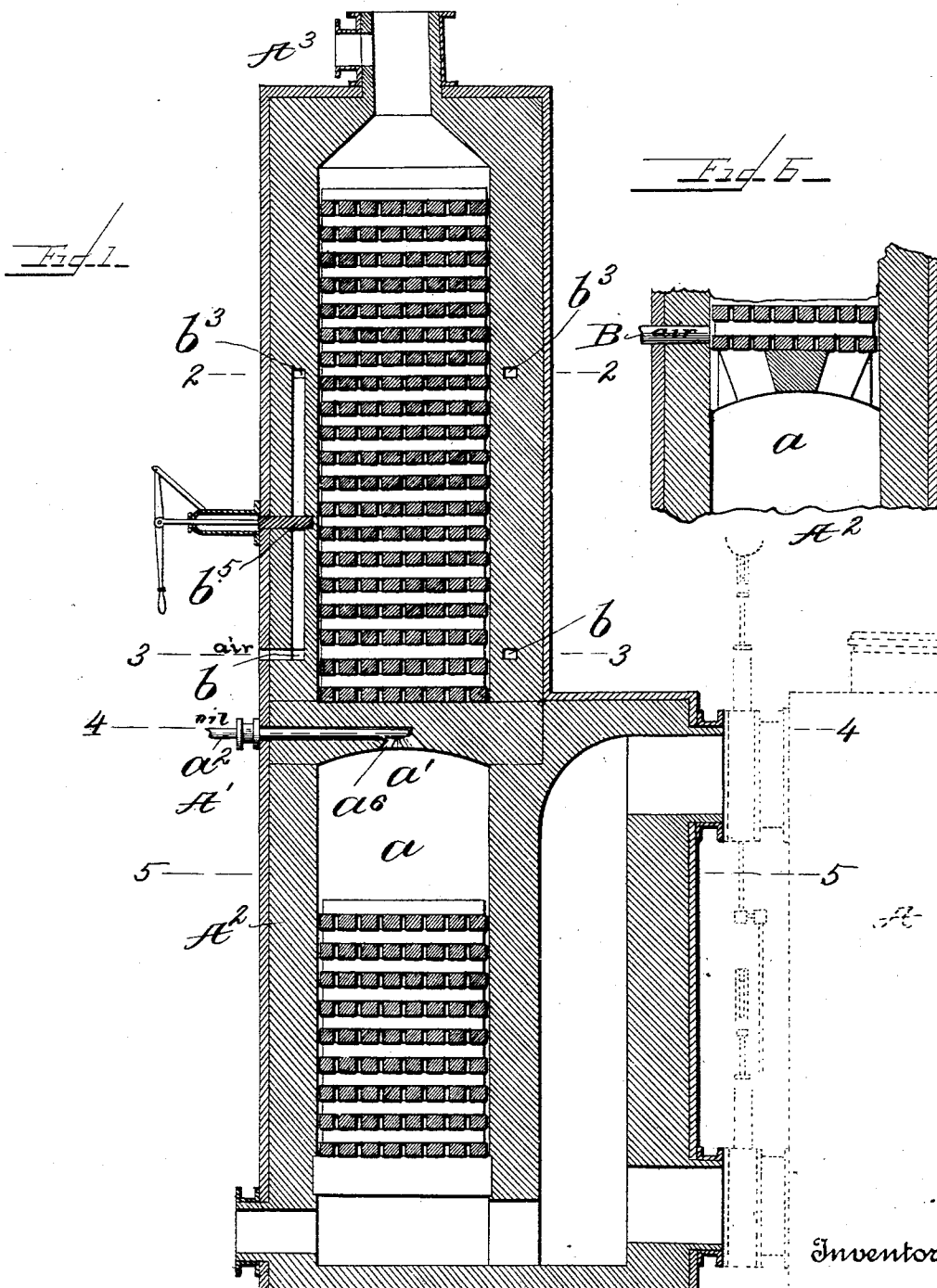


L. L. MERRIFIELD.
APPARATUS FOR MANUFACTURE OF GAS.

No. 541,107.

Patented June 18, 1895.



Witnesses

D. A. Paubewschmitt.
W. C. Smith

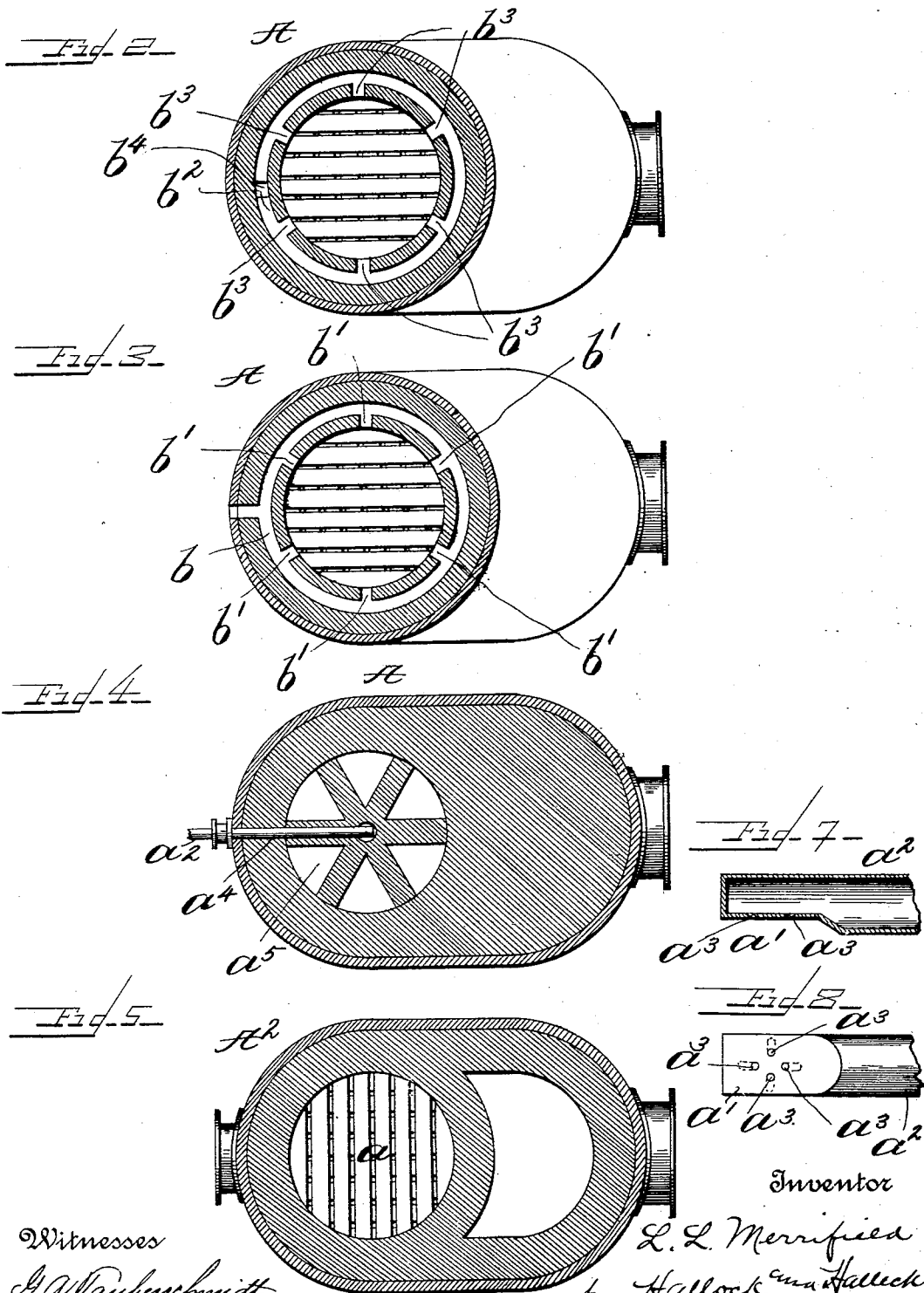
L. L. Merrifield
per Hallock and Hallock

Attorneys

L. L. MERRIFIELD.
APPARATUS FOR MANUFACTURE OF GAS.

No. 541,107.

Patented June 18, 1895.



Witnesses

J. A. Paulschmitt.
Wm. E. Smith

Inventor

L. L. Merrifield
per Hallock and Hallock

Attorneys

UNITED STATES PATENT OFFICE.

LEONARD LANCASTER MERRIFIELD, OF FRANKLIN, MASSACHUSETTS, ASSIGNOR TO THE ECONOMICAL GAS APPARATUS CONSTRUCTION COMPANY, LIMITED, OF TORONTO, CANADA.

APPARATUS FOR MANUFACTURE OF GAS.

SPECIFICATION forming part of Letters Patent No. 541,107, dated June 18, 1895.

Application filed April 14, 1894. Serial No. 507,551. (No model.)

To all whom it may concern:

Be it known that I, LEONARD LANCASTER MERRIFIELD, a citizen of the United States, residing at Franklin, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Apparatus for Manufacturing Gas; 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.

My invention relates to that class of gas making apparatus shown and described in Patent No. 505,714, granted to Merrifield, Westcott and Pearson, September 26, 1893.

The object of my invention is to improve upon the general construction of the apparatus shown therein, particularly as to the admission of the air and the oil to the superheater.

To that end the invention consists of constructions and combinations, all as will hereinafter be described in the specification and pointed out in the claims, reference being had to the accompanying drawings, in which—

Figure 1 represents a vertical section of the superheater connected with a generator, shown in dotted lines; Fig. 2, a section on line 2 2, Fig. 1; Fig. 3, a section on line 3 3, Fig. 1; Fig. 4, a section on line 4 4, Fig. 1; Fig. 5, a section on line 5 5, Fig. 1; Fig. 6, a modification of the means for supplying the air; Fig. 7, a section of the injector, and Fig. 8 a bottom view of the same.

A, represents the generator, and A' the superheater, the heating chamber A² of which is provided with checker arranged in the usual way known as checker work or brick. The checker brick may fill the chamber if desired, but I prefer to leave a space or sub-chamber *a* for the purpose of mingling the hydrocarbon or other oils with the water gas sent from the generator.

The oils have heretofore been injected into the superheater on a line at an angle to the direction in which the water gas is moving. The object of such arrangement is to spray the oil toward the center of the current of water gas for the purpose of carbureting the same. Such an arrangement, however, does

not fully accomplish the object as the oil cannot be evenly distributed to the water gas; but on the contrary, that portion of the gas current that is nearest the nozzle receives too much oil and the part farthest away receives little or no oil. The result of this arrangement is the cooling of that part of the superheater nearest the spray because of the amount of oil received causing the formation of coal tar and the overheating of the other parts causing the formation of lamp black.

The object of my construction is to deliver at the center of the uprising current of water gas, a spray of oil in such manner that the current of water gas will be thoroughly carbureted without wasting the oil as is the case when lamp black and tar are formed in the carburetor.

To carry out my invention the spraying end *a'* of the oil injector *a*² is introduced into the upper part of said chamber or space *a* with its center in the vertical center of said chamber so that the water gas will pass around and above it in its passage to the outlet A³. In other words, the oil under pressure will be introduced into the central part of the current of ascending gas and which, owing to its velocity will distribute the vapor made from the oil more evenly than would be the case if the spray were projected into it at an angle. The preferred means for carrying out this object is shown in the drawings. It consists of an injector *a*², having a flattened end *a'* with oblique openings *a*³ converging at a point outside the end in which they are placed so that the oil jets which are forced into the injector are ejected into the superheating chamber at converging angles meeting at a common point, preferably the vertical center of the chamber and causing the meeting jets to form a spray that is taken up by the water gas. The injector is preferably protected from the heated currents passing through the superheater. In the present instance the injector is shown in a lateral channel *a*⁴ leading through the wall of the superheater and top of the chamber *a*, which is in the form of an arch *a*⁵ to the center of the latter where the flattened end of the injector is exposed through an opening *a*⁶ in the arch, so that the jets of oil

sprayed through the openings a^3 will be sent downward to meet the upcoming currents of water gas. The injector can be secured in the passage in any desired way, preferably, by means that will permit of its removal when desired.

Heretofore it has been the practice in heating up the superheater to introduce air into the chamber a to promote combustion. This arrangement, in fact makes the chamber a a secondary combustion chamber. In practice it has been found that the intense heat in this chamber heats the top chamber a , or the arch a^5 to such a degree that it ultimately destroys it, causing great expense of renewal and break downs when least expected. It also heats the top courses of the checker brick below the arch to a very high temperature and makes the temperature too high for the proper gasifying of the oil injected into said chamber. This intense heating of the chamber results in the deposition of the oil upon the arch and some of the upper layers of the checker work in the form of globules of carbon. By avoiding the use of air in this intermediate chamber and projecting the oil into the center of the upcoming currents of water gas these objections are avoided to a certain extent, and are completely overcome by the means now to be described. Air instead of being introduced into this chamber is introduced immediately above the arch directly into the checker work. The effect of the introduction of the air at this point is to keep the arch cool thereby preventing the burning out of the injector, and also preventing the arch from becoming intensely heated and thereby carbonizing the oil thereon in the form of globules of carbon. The air can be forced into the checker work by means of a pipe B, which terminates at the inner side of the wall through which it is inserted, or as far into the checker work as may be desired, as shown in Fig. 6; or it can be forced into an annular recess b in the wall of the superheater and having openings b' opposite the openings between the checker brick which are arranged at this point substantially as arranged throughout the superheater, Fig. 5, showing the arrangement in the lower part of the superheater. The air so admitted is distributed more evenly than would be the case with the device shown in Fig. 6.

Air may be admitted at as many points as desired in the superheater. In Fig. 1, a second annular recess b^2 having openings b^3 is shown above recess b' and is connected therewith by a vertical passage b^4 , having a valve b^5 for controlling the flow of air thereto. The air supplied in this second recess aids in heating the upper layers of checker work, an important feature as the oil has become thoroughly vaporized by the time it reaches the upper layers and becomes fixed as a gas in combination with the water gas. It also makes the heat more uniform throughout the heater instead of having spots or places of

intense heat as is the case when the air is fed into sub-combustion chambers.

What I claim as new is—

1. In a gas making apparatus, the combination of a superheater, checker work in said superheater, a chamber or space intermediate the upper and lower portions of the checker work, an oil injector having its spraying nozzle facing downward in the upper part and vertical center of said chamber, and an air opening in the superheater communicating with the checker work above said chamber and oil injector to admit air to the upper portion of said superheater.

2. In a gas making machine, the combination of a superheater, checker work in said superheater, a chamber or space intermediate the upper and lower portions of said checker work, an oil injector having its spraying nozzle provided with oblique openings that project the oil downward toward a common point at or near the vertical center of the chamber, and an air opening in the superheater communicating with the checker work above said chamber and oil injector to admit air to the upper portion of said superheater.

3. In a gas making apparatus, the combination of a superheater, checker work in said superheater, a chamber intermediate the upper and lower portions of said checker work, an oil injector having its body protected by the brick work and its spraying nozzle opening downward into the upper part of said chamber at a point substantially near the vertical center, and an air opening in the superheater communicating with the checker work above said chamber and oil injector to admit air to the upper portion of said superheater.

4. In a gas making apparatus, the combination of a superheater, checker work in said superheater, a chamber intermediate the upper and lower portions of said checker work, an oil injector having a spraying nozzle formed with converging oblique openings in its under face and having its body protected by the brick work forming the upper part of said chamber; said oblique openings projecting the oil downward toward a common point at or near the vertical center of the chamber, and an air opening in the superheater communicating with the checker work above said chamber and oil injector to admit air to the upper portion of said superheater.

5. In a gas making apparatus, the combination of a superheater, checker brick in said superheater, a chamber formed intermediate the upper and lower portions of the checker work, an oil injector having its nozzle in said chamber, and an opening in the superheater communicating with the checker brick immediately above the top of said chamber for admitting air to said checker work and cooling the top wall of said chamber.

6. In a gas making apparatus, the combination of a superheater, checker brick in said superheater, a chamber intermediate the upper and lower portions of said checker brick,

an oil injector having its body protected by the brick forming the top of the chamber and its nozzle opening into the upper part of said chamber, and an opening in the superheater communicating with the checker brick immediately above the top of said chamber for admitting air to said checker work and cooling the top wall of said chamber.

7. In a gas making apparatus, the combination of a superheater, checker brick in said superheater, a chamber intermediate the upper and lower portions of said checker brick, an oil injector connected with said chamber, an opening in the superheater immediately above the top of said chamber for admitting air to said checker work above the chamber and cooling the top wall of said chamber, and a second opening in said superheater for admitting air to the upper part of said checker brick above the chamber.

8. In a gas making apparatus, the combination of a superheater, checker brick in said superheater, a chamber intermediate the upper and lower portions of said checker brick, an oil injector connected with said chamber, an opening in the superheater immediately above the top of said chamber for admitting air to said checker brick above the chamber and cooling the top wall of said chamber, and a second opening in said superheater for admitting air to the upper part of said checker brick above the chamber, and connected with the lower opening by a passage provided with a valve.

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

LEONARD LANCASTER MERRIFIELD.

Witnesses:

H. G. ROAT,
C. E. ROAT.