

(No Model.)

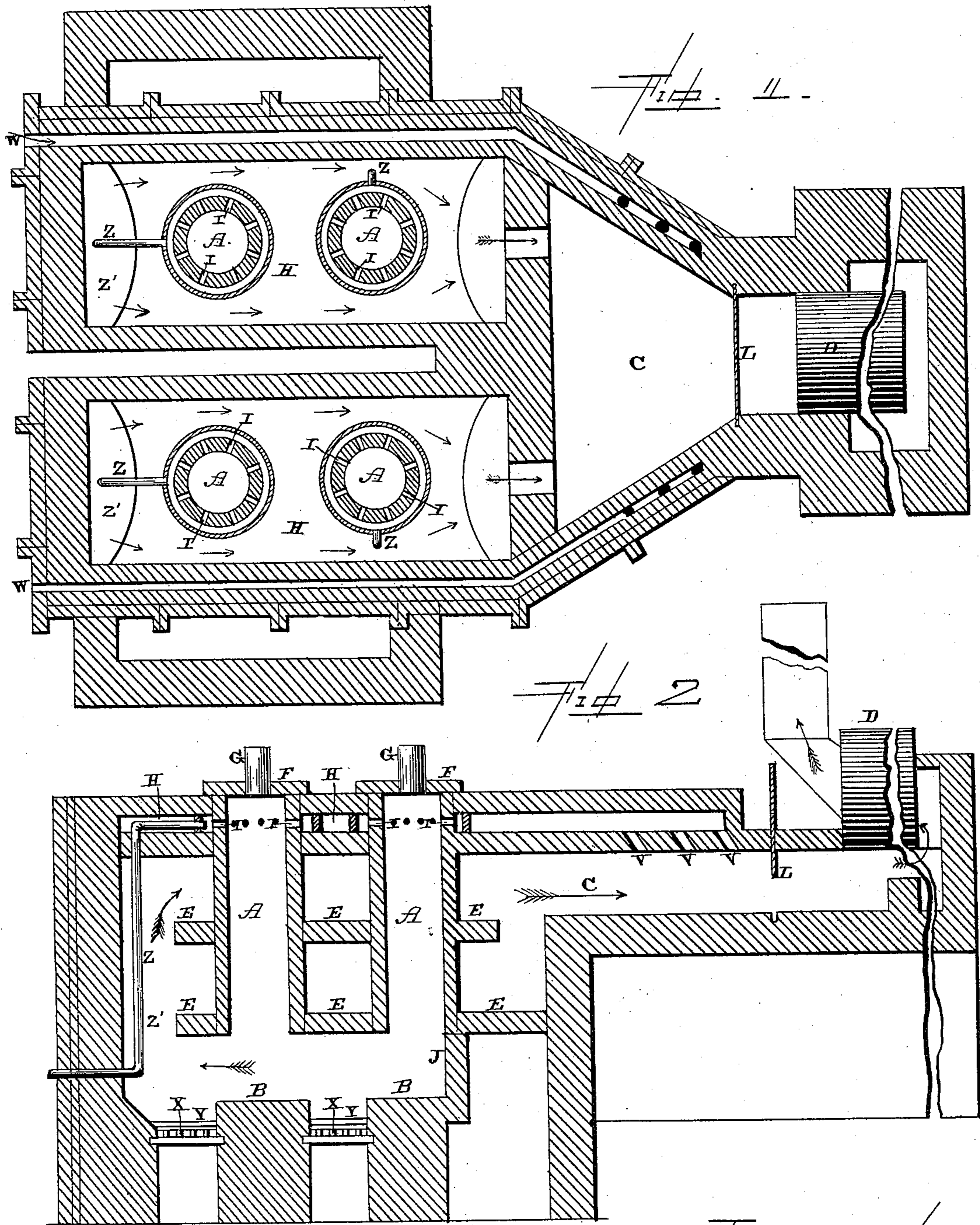
2 Sheets—Sheet 1.

W. L. McNAIR.

GAS PRODUCER.

No. 370,273.

Patented Sept. 20, 1887.



WITNESSES.

X. D. Gardner  
E. P. Ellis

INVENTOR.  
W. L. McNair,  
per F. A. Lehmann,  
att'y

(No Model.)

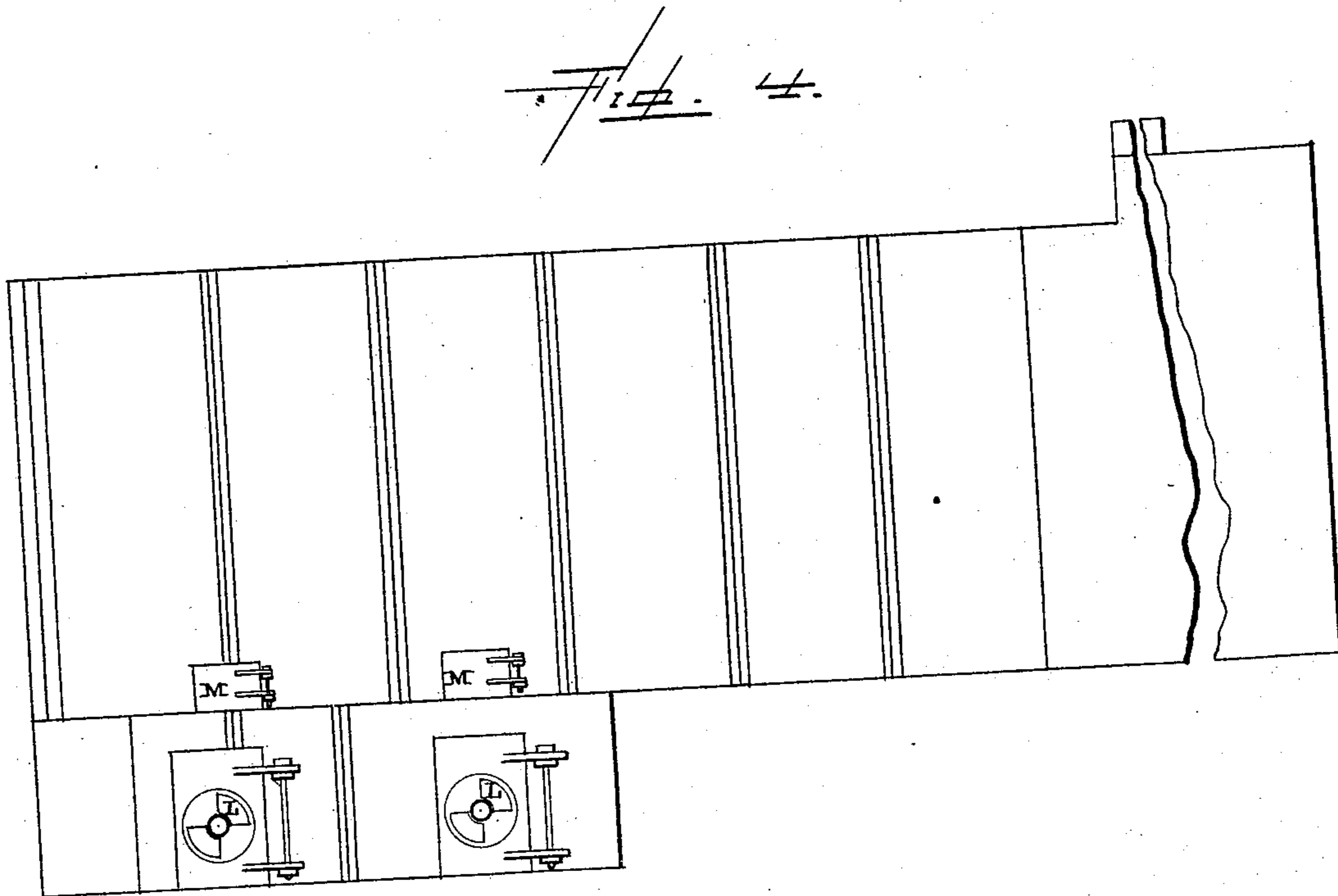
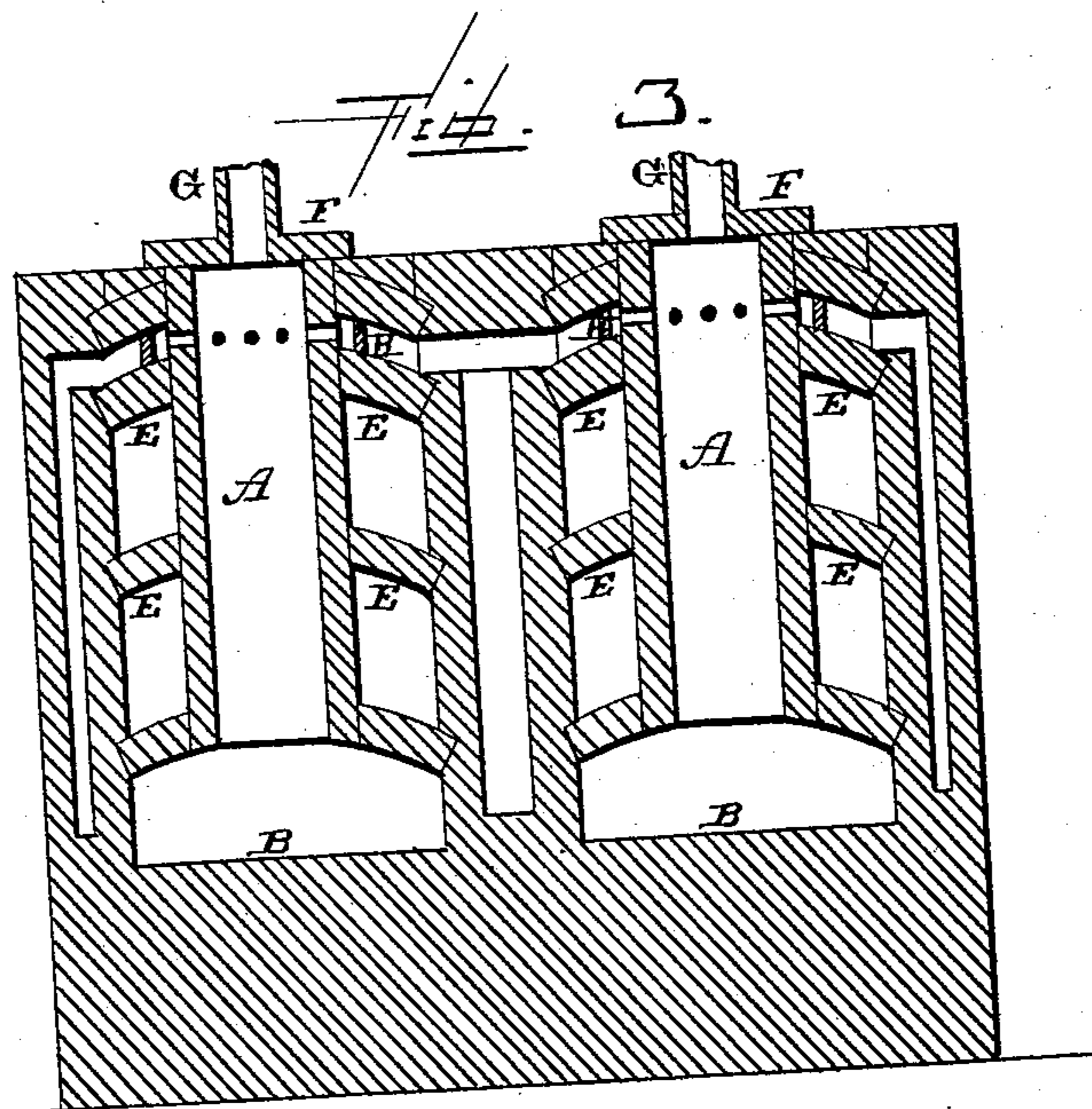
2 Sheets—Sheet 2.

W. L. McNAIR.

GAS PRODUCER.

No. 370,273.

Patented Sept. 20, 1887.



WITNESSES.

L. H. Gardner  
E. P. Ellis

INVENTOR

W. L. McNair,

per. J. A. Lehmann, atty.

# UNITED STATES PATENT OFFICE.

WILLIAM LYON McNAIR, OF DENVER, COLORADO.

## GAS-PRODUCER.

SPECIFICATION forming part of Letters Patent No. 370,273, dated September 20, 1887.

Application filed March 12, 1887. Serial No. 230,711. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM LYON McNAIR, of Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Gas-Producers; 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 pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in gas-producers; and it consists in the combination and arrangement of parts, as will be more fully described hereinafter, and set forth in the claims.

Figure 1 is a horizontal section of a gas-producer shown in connection with a boiler. Fig. 2 is a vertical longitudinal section taken at right angles to Fig. 1, and through two of the retorts. Fig. 3 is a detail view of the retorts taken at right angles to Fig. 2. Fig. 4 is a side elevation of a gas-producer.

A represents the retorts in which the coal is placed to be distilled, and B the hearths, which are placed just below the retorts for the purpose of supporting the fuel which is being used in the retorts. These retorts are preferably arranged in separate and distinct series, so that they can be worked alternately without any connection with each other and thus keep up a constant supply of gas. These retorts A are placed vertically and are supported by means of the arches E, which are built around them and extend from one side of the frame-work in which they are placed to the other. The two grates X are arranged in the relation shown to the two hearths B, and in order to prevent the products of combustion from passing from these grates X directly through into the flue C, a wall, J, is built from the rear edge of the rear hearth, so as to extend up from the under side of the retort A, and thus force all of the products of combustion and the gas to pass toward the front of the frame-work and then up and around the retorts A for the purpose of heating them. Each grate X is provided with a slide, Y, which can be forced directly over the top of the grate-bars, so as to shut off all passage of air through the grate to the fire burning thereon. These slides are

operated through the doors M, which are provided especially for this purpose, and at the same time the registers L in the doors leading to the ash-pits are to be closed.

Around the upper portion of each of the retorts A is formed a chamber, H, and leading from this chamber through the sides of the retorts are a number of small openings, I. Steam is introduced into this chamber H through a suitable pipe or pipes, Z, which steam becomes superheated in the chamber H and then passes through the opening I into the retorts A, where it passes down through the coke in the retorts. These pipes Z extend through the front wall of the furnace and pass up through the openings Z' made in the front end of the furnace, and up through which the products of combustion pass. Each one of the retorts is provided with a removable cover, F, through which the retort is charged with fuel, and passing through these covers are the blast-pipes G, through which the air is allowed to pass when the retorts become sufficiently heated to distill the volatile matter in the fuel, and the air-ports L are closed and the slides Y are forced over the grates X. When the fuel in the retorts is burned to the desired depth, the air is turned on the second pair of retorts and the first pair are refilled. They are thus worked alternately. One pair reduces the coke and the other heats it preparatory to its reduction. Made through the frame-work are suitable air-passages, W, through which air passes and becomes heated and then passes through the ports V into the flue C, where it mingles with the gas from the retorts.

Placed at the rear end of the flue is the steam-boiler D, through which the heated products of combustion pass. Extending across the flue C is a suitable valve, L, for the purpose of regulating the heat in its passage to the boiler. The fuel in the retorts is converted into carbonic oxide, and then it passes around the retorts into the flue C, where it has mixed with it a proper proportion of heated air from the ports V and burned to CO<sub>2</sub> just before entering the boiler, thus giving out the maximum heat of the fuel.

By the construction shown and described the retorts are heated by the gases before they enter the chamber H. The air is admitted upon

the top of the fuel, instead of below, as in the ordinary grate. The fresh fuel is discharged in on top of the hot fuel in the retorts, thus causing all steam formed from water in the coal to pass down through the column of heated fuel, so as to insure its thorough decomposition, and slack or refuse coal which cannot be used in a grate can be used in the retorts.

The slide Y, which covers the grate under one of the cylinders, is withdrawn, the fire is kindled, and the fuel is then charged into the cylinder. The lower portion of the fuel being supported upon the hearth B, the blast is turned in through the pipe G, so as to support combustion, and at the same time steam is turned into the top of the cylinder through the pipe Z. This steam becomes superheated in the chamber H, and as it passes through the fuel all of the products of combustion pass forward toward the front end of the frame-work, because the wall J prevents any backward passage of them toward the stack. In causing the products of combustion to pass forward they are made to pass around the sides of the cylinders, so as to thoroughly heat them and thus decompose the fuel. After one set of cylinders have been used, the slide can be pushed inward over the tops of their grates, so as to shut off all further combustion, and then a new pair of cylinders is brought into use. By operating the two pairs of cylinders alternately a constant and steady supply of gas is kept up.

Having thus described my invention, I claim—

35 1. The combination of the vertical chambers arranged in pairs, the hearths B, located under the cylinders, the grates located side by side

with the hearths, the arches which support the cylinders in position, and the wall J, which is built back of each hearth, so as to prevent any passage backward of the products of combustion.

2. The combination of the vertical cylinders A, provided with a series of openings, I, at their upper ends, a steam-chamber placed around the upper ends of the cylinders, the pipes Z, through which steam is introduced into the steam-chamber, the hearths B and grates X, located under the cylinders, the vertical wall J, which prevents the products of combustion from passing backward into the flue, and the arches E, which support the cylinders in position, substantially as described.

3. The combination of the vertical cylinders A, the hearths B, the grates X, located under the cylinders, the arches E, which support the cylinders in position, the vertical wall J, the flue C, and the slides Y, which are forced in over the grates, substantially as set forth.

4. The combination of the frame-work provided with air-passages W, which extend horizontally backward, and the ports V, which open from the air-passage into the flue C, with the vertical retorts A, the arches E, which support the retorts in position, the hearths B and grates X, located below the retorts, and vertical wall J, located back of the grates, substantially as specified.

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

WILLIAM LYON McNAIR.

Witnesses:

JOHN T. WESTBER,  
WALTER WILSON.